Old Series, Vol. LIV

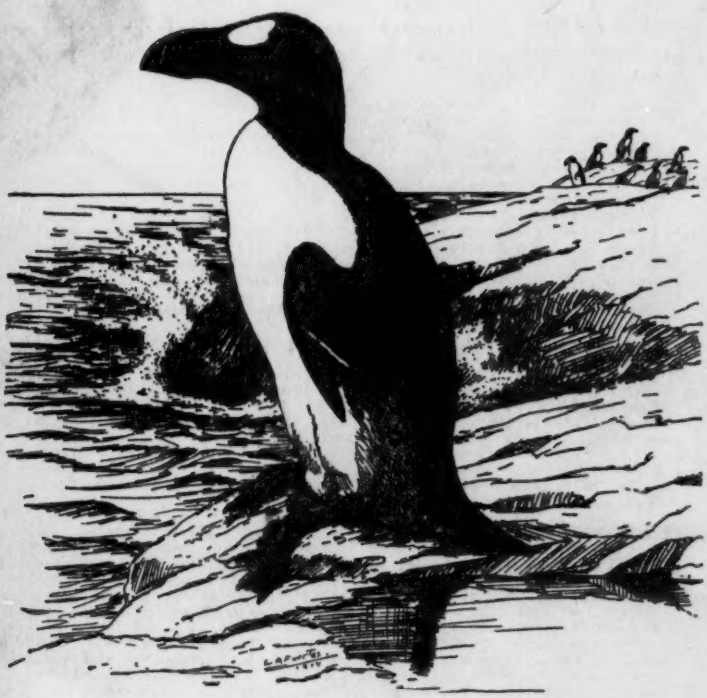
CONTINUATION OF THE BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

New Series, Vol. XLVI

The Auk

A Quarterly Journal of Ornithology

Vol. XLVI OCTOBER, 1929 No. 4



PUBLISHED BY

The American Ornithologists' Union

LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

CONTENTS.

UPPER.—PURPLE GALLINULE (*Ionornis martinicus*) INCUBATING HER EGGS. SHANNON COVE, BARRO COLORADO ISLAND, JULY 28, 1925.
LOWER.—NEST AND EGGS OF PURPLE GALLINULE, JULY 28, 1925.

THE AUK:

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ORNITHOLOGY.

VOL. XLVI. OCTOBER, 1929. No. 4.

THE PURPLE GALLINULE (*IONORNIS MARTINICUS*) OF BARRO COLORADO ISLAND, CANAL ZONE.

BY ALFRED O. GROSS AND JOSSELYN VAN TYNE.

Plates XX–XXIV.

BARRO COLORADO is an island formed at the time the Chagres River was dammed in constructing the Panama Canal. This island, about four miles long and three and a half miles wide, comprising nearly 3800 acres, is covered with a dense growth of virgin "rain forest." Fortunately, the Canal Zone government has set aside the island as a wild life reservation to be preserved for all time for students of tropical biology. A large laboratory with excellent facilities located in the midst of the jungle, enables visiting ornithologists to conduct intensive life history studies, which otherwise would be very difficult and in many cases impossible.

The coastline of the island is very jagged in outline, producing numerous protected coves. These coves are still dotted with the stumps and trunks of trees of the partially submerged forest which was flooded by the rising waters of Gatun Lake, more than fifteen years ago. Many of the trees have rotted at the water level, fallen, and then driven by the winds have collected in the recesses of the coves, there to form floating islands. Some of these islands, anchored by snags of tree stumps, are now grown over with ferns, grasses and other plants, producing ideal nesting sites for certain species of water birds. It was one of these floating islands situated in a protected cove within sight of the laboratory

that a pair of Purple Gallinules built their nest during the summer of 1925. The nest was constructed near the outer edge of an island and was so completely hidden from view by the overarching grasses that its existence would never be suspected by a passing observer. It required the sharp eyes of Donato, the Indian boy employed at the laboratory, to locate the nest for us. It was only twenty feet away from the shores of Barro Colorado Island where the jungle rose sheer from the water's edge. The tall dense vegetation with its screaming Parrots, its gorgeous Trogons and howling monkeys, produced an environment of striking contrast to what we generally associate with the surroundings of the homes of water birds in the north. The diversity of life in the vicinity of the nest proved of the greatest interest to the observers who spent many hours in the Gallinule blind.

The Purple Gallinule is a breeding bird of the southern sections of the Gulf States and nests have been found as far north as Charleston, South Carolina. Birds have also been reported in New England, southern Canada and the states of the Middle West. The results of a study of this bird in the Tropics will, we hope, be of interest for comparison with similar studies made of this species in the north.

THE NEST.

The foundation of the Barro Colorado Island nest was made largely of undetached green grass blades which were pulled down and woven together by the birds to form a hollowed platform, the hollow being about five centimeters deep. To this platform the birds added a few dead reeds and grass stems. The platform was thirty-five centimeters across but the nest proper (the part occupied by the nesting bird) was only about twenty centimeters in diameter. At the time the nest was discovered it was twenty-five centimeters above the water level of the lake, but this level gradually rose as the rainy season progressed and before the young were hatched the nest was in danger of being flooded. Indeed, several nests of the Gallinule in other parts of the lake were destroyed in this manner.

One of the striking features of a Gallinule's nest is the runway which the birds construct. This runway is an important part of the bird's nesting activities and as a structure is second only to

the nest proper which supports the eggs and the incubating bird. In this case the nest was closed in by a thick fringe of tall grass except on the south or land side which opened up to a well constructed runway. The runway led downward almost to the level of the water to a rather open spot among the tall grass. From this point there was a much more pretentious trestle of woven grass which led up to a frail platform about two feet above the water and more than ten feet away from the nest. It required more time and effort on the part of the birds to construct this runway and platform than the nest itself and during the incubation period it was in constant need of repairs and was continually undergoing slight changes and additions. It was used by the birds in approaching and in leaving the nest. The incubating bird, when suddenly surprised would stealthily sneak down this runway and up to the platform from which it could easily take flight, a feat not so readily accomplished from a lower level among the reeds and grasses. We have not noted a description of such an elaborate runway in the accounts of other Purple Gallinule nests, but less pretentious pathways have been observed in connection with the nests of the Florida Gallinule. Mr. William Brewster[1] describes a pathway about six inches in length which led from the nest of a Florida Gallinule near Cambridge, Massachusetts. Mr. Clinton S. Abbott[2] states that most every nest found by him in the Hackensack Meadows, New Jersey, had a sloping runway to the water's edge by which the bird probably always entered and left the nest.

THE EGGS.

The Barro Colorado Island nest when found on the evening of July 12, 1925 was said to contain three eggs and when we examined it the following morning there were four eggs, thus assuring us that our study of this nest started at the time the set was completed on July 13. Two young hatched on August 2 and the other two on August 3, indicating that incubation probably started at the time that the second egg was layed. This record indicates an incubation period of about twenty-two days. The

[1] Brewster, William, 1891. A study of a Florida Gallinule's nest with some notes on a nest found at Cambridge, Massachusetts. Auk, vol. 8, pp. 1–7.
[2] Abbott, Clinton G. 1907. Auk, vol. 24, pp. 1–11.

eggs have a ground color of cartridge buff finely marked with irregular spots of cinnamon brown, pale violet gray and lilac gray. The markings were heaviest at the larger end of the eggs.

The weights and measurements of the eggs were as follows:—

Number	Long Diameter	Short Diameter	Weight
1.	40.2 mm.	29.8 mm.	16.10 gram.
2.	42.8 "	28.9 "	16.35 "
3.	41.1 "	28.5 "	16.08 "
4.	39.1 "	29.0 "	15.15 "

The weights and measurements of a nest of three eggs found on a floating island in Shannon's Cove on the opposite side of the island were as follows:—

Number	Long Diameter	Short Diameter	Weight
1.	39.5 mm	27.8 mm.	15.9 grams
2.	39.1 "	27.5 "	15.4 "
3.	38.9 "	27.1 "	14.95 "

As would be expected the number of eggs in sets of the Gallinule found in the Tropics are smaller than those nesting in the Temperate Zone of North America; a condition previously noted among representatives of other families of birds.[1] In the north the Purple Gallinule usually lays from six to eight eggs and some sets as large as ten have been recorded. Mr. A. C. Bent[2] records five as the minimum number of eggs layed by the species.

BEHAVIOR.

In order to study the normal activities and behavior of the birds we constructed a blind, the front of which was less than four feet from the nest. There were several feet of water beneath the floating island, hence it was necessary to fasten the platform of the blind to long poles which were driven into the mud and secured to logs constituting a part of the island. The blind was built a little at a time over a period of several days in order to reduce the disturbance to the birds to a minimum. By the time the blind was completed the birds behaved in an apparently normal

[1] Gross, Alfred O. 1927. Barro Colorado Island Biological Station Smithsonian Report for 1926, p. 337.

[2] Bent, A. C. 1926. U. S. Nat. Mus. Bull. 135, p. 342.

UPPER.—PURPLE GALLINULE PROTECTING HER EGGS FROM HEAT OF TROPICAL SUN. CONTROLLING TEMPERATURE BY RAPID RESPIRATION. JULY 25. LOWER.—INCUBATING EGGS, AS SEEN THROUGH TALL GRASS. JULY 24.

manner paying not the least attention to it as they went back and forth to the nest. They were, however, very sensitive to noises and other disturbances especially those originating from the lake side of the nest. We always approached the nest from the lake by means of a cayuca, the native dug-out canoe. During our first visits, when we were within thirty to fifty feet of the blind the brooding bird would leave quietly and skulk down the runway. As we approached nearer she would arise and with her long yellow legs dangling would fly to the outer branches of the dense thicket along the shore. There she would clamber awkwardly about the branches, balancing herself with half spread wings, twitch her tail nervously and peer out at us as she anxiously watched our inspection of her nest. As the bird became more accustomed to our visits she would disappear in the tall grass without flushing. On such occasions as soon as we entered the blind the bird would return immediately; or less frequently, after noting all was well, she would idle about the nest for a quarter or half an hour before incubating the eggs again.

Sometimes both birds appeared on the scene and with their brilliant colors made a striking and beautiful picture as they gracefully moved through the grass now preening their glossy blue and purple plumage, now idly searching for food, but more frequently working on the runway. Construction of the runway was accomplished by pulling down an overhanging blade of grass with the bill and then holding it down with one foot, dexterously weaving it into the structure. This done the bird carefully selected another long grass stem and repeated the process until many such additions had been made. The birds however, never neglected the eggs for any great length of time for the sake of building or repairing the runway, but sooner or later one of the pair would cautiously make its way back to the nest. As we watched the birds proceed over the tangled masses of grass stems, we were impressed with the admirable adaptation of the long toes and nails for walking on such uneven surfaces. The bird on arriving at the nest, briefly inspected it, then awkwardly walked on to the eggs with her head faced toward the lake. Invariably however, the bird shifted its position immediately so that it faced the entrance of the runway toward the jungle. This

position enabled the bird to leave quickly when alarmed, with a minimum disturbance to the nest.

Both the male and female took their turns at incubation regularly every three or four hours. At the end of the shift the mate would come flying in, usually alighting on the elevated platform at the end of the runway. The exchange of the birds was attended by the most interesting ceremony of which the following account taken from our notes is typical of their behavior. After some delay at the platform he (as the returning bird may be designated) walked leisurely down the path a short distance and then began pulling and tugging at a dead reed. After considerable effort he dislodged a piece about six inches long and came triumphantly up the path toward the nest. Meanwhile, the female (the bird on the nest) who had been carefully watching the proceedings, picked nervously at the materials comprising the edge of the nest. The male now came up and presented the piece of dead reed to his mate. She took it and carefully added it to the nest. The male gazed at her expectantly but as she showed no inclination to go he returned for more nesting materials. After a very brief search he secured a dead leaf which, like the reed, was offered to his mate. The female added the leaf to the nest and then abruptly walked off past the waiting male to the end of the runway. Without any delay she flew down the shore to a point out of sight of the blind. The male then carefully examined the eggs, rolled them and awkwardly adjusted himself to the nest facing as usual toward the shore.

The nest building instinct was very strong in these birds and during the entire three weeks of incubation it was rare that either of the pair returned to the nest without bringing a piece of grass or leaf to be added to the structure. This behavior continued up to the time the young left the nest as is indicated beyond in the account of the young.

July is a rainy month in the Canal Zone and the sky was usually clouded over all day, even though it did not actually rain. At mid-day therefore, it was often very warm and cloudy and incubation was unnecessary. At such times the nest was left unattended for short periods. With these exceptions, the eggs were kept covered continuously by the faithful parents. After three weeks

of incubation the sitting bird was often seen to arise and turn the eggs with its bill and again settle on them. Sometimes it was done so frequently as to be little more than a nervous habit, for certainly three times in a bare half hour can hardly serve any useful purpose. When the task of incubation became burdensome, the sitting bird would yawn widely and then perhaps doze a while. Any unusual noise would instantly arouse the bird and it would look anxiously in the direction of the sound and if much alarmed, would raise slightly the feathers of the crown. The Gallinules seemed to discriminate but little and a passing flock of screaming Parrots or a pair of Toucans foraging noisily in a nearby tree alarmed them quite as much as the approach of some predatory mammal.

Upon our arrival at the nest on the morning of July 24 we found the nest had sagged so much toward the rising waters of the lake that it was in imminent danger of destruction. We raised it some six inches and propped it securely in that position. After completing this we entered the blind and within five minutes the bird, which had been flushed from the nest by our arrival came back walking up the runway with a piece of grass in its bill. But arriving at the nest the bird appeared confused and tried again and again to go under it and only after a minute and a half of this did the bird discover the nest in its slightly raised position. It was in plain sight all this time but the bird was evidently so accustomed to locating the nest by its remembered position that the evidence of sight was entirely disregarded until all efforts to locate the nest by position had failed. The bird then inspected the eggs and settled down to incubate without further ado. A half hour later a loud splash nearby, presumably a crocodile, frightened the Gallinule from the nest, but within fifteen minutes the bird came cautiously back along the runway. This time the bird seemed to profit some by experience and after only two attempts to go under the nest, she rediscovered its new position and again settled on the eggs.

NOTES AND CALLS.

We found the Gallinules to have a great diversity of calls and they seemed to have special notes for most every occasion. Usually

when the bird was disturbed by our approach, it would utter a single sharply accented note before it took flight to the shore of the cove. After alighting it frequently gave in addition to this preliminary note, a guttural sound and occasionally a loud hen-like "*co-doodle.*" Either bird when flying to the nesting island would utter a very loud metallic clucking call which apparently was for the purpose of attracting attention. If no enemies were in evidence after waiting at the lookout for a time, the birds would deem it safe to proceed. While approaching the nest down the runway the birds were silent, but when settled on the nest and apparently free from all fear the bird would utter a guttural "*whonk*" followed by a queer snapping of the bill. This snapping sound proved to be one of the most characteristic notes uttered by the birds. It was evidently a sign of "all is well" for it was very often answered by the mate although the latter was not in view of the blind but somewhere in the dense grass or shrubbery along the shore. At times the bird on shore would utter a clucking sound which was answered immediately by the snapping-of-the-beak sound by the bird on the nest. Though we watched the performance many times we could not definitely determine whether the mandible actually struck the maxilla or not because of the rapid vibration. (This snapping note was frequently heard in November when collecting birds in the grassy inlets of Gatun Lake. In fact it was this note which invariably led me to the discovery of their presence in the tall reeds and grass.) At intervals the nesting bird would give a *cac-cac-cac* or *cut-cut-cut* call, the significance of which we could not determine.

On October 23, 1927 while watching an adult and an immature bird in juvenal plumage in a marsh near Frijoles the birds gave certain calls which were quite unlike those we heard during the nesting period. The adult gave a call which I thought was an outcry of the Ani bird nearby when I first heard it, whereas the young responded with a queer "*aunk, aunk, aunk*" as they answered the parent and attempted to follow her through the tall grasses and reeds.

BEHAVIOR OF PARENTS AT HATCHING TIME.

These Gallinules, like most other birds, at the time of the hatching of the young, exhibited a marked difference in their general

UPPER.—PURPLE GALLINULE ON LOWER SUBMERGED PART OF RUNWAY. LONG TOES AND NAILS ADMIRABLY ADAPTED TO WALKING OVER SUCH SPOTS. LOWER.—ADULT PRESENTING PIECE OF PALM LEAF TO MATE WHICH SHE HAD ATTEMPTED TO FEED TO YOUNG. NOTE NEWLY HATCHED YOUNG IN FRONT OF BREAST.

behavior. This important event seemed to stimulate their activity about the nest and both birds exhibited a greater indifference to our presence and to outside disturbances.

On the morning of August 2 we found one black downy chick newly hatched and one egg well pipped. One of the parent birds was brooding the young and showed little fear as we approached the nest. She merely retired a few feet away and there watched anxiously as we entered the blind. A few minutes later she (so sexed by courtesy only) returned to brood the youngster who had kept up a shrill peeping during her absence. She climbed into the nest immediately, tramping over the chick with the greatest indifference. Even after she had covered it, it continued to peep vigorously. In a short time the hatched chick worked itself forward but when its head protruded through her breast feathers the parent bird immediately pushed it back out of sight. Later, however, the young were often permitted to remain in this position. Within an hour the second one had hatched. The old bird then left the nest and the two chicks huddled silently together until she returned twenty minutes later. She brought no food and seemed somewhat surprised to see the young. As she peered over the edge of the nest the young began to peep and to jump up and grasp her bill as if begging for food. They continued this performance while she attempted to brood them but finally were reconciled. She sometimes arose to examine them or, more frequently, inserted her head under the breast feathers without rising. After half an hour she left the nest to search for food in the marsh grass near the nest. In a few minutes she returned bearing a small insect in her beak. The downy young became excited at her approach, peeping and waving their heads about frantically. Without coming on the nest the parent with neck outstretched held the food before the elder chick who made eager but ill directed snatches at it and finally secured and swallowed it. The proceedure was watched on many subsequent occasions and was found to vary but little. The parent bird usually reached into the nest from the outside and never did more than dangle the insect before the chick. On one occasion the parent bird brought to the young a rather large spider. The young one made repeated passes at this handsome morsel but the spider was too

large and the chick dropped it after each try. The old bird then picked it up again and held it before the chick. After four such failures the old bird seemed puzzled and, taking up the bedraggled spider, walked off a few feet. Standing undecided a few minutes she dipped the spider in the water a few times and squeezing it a little again brought it to the nest. Three more attempts sufficed to wear down the recalcitrant spider to a more convenient size and it was eventually eaten. A similar performance took place when a tough water beetle was offered, but this time no amount of washing and mashing would avail and in the end the insect was eaten by the old bird. Both parents fed and cared for the chicks and neither seemed to stray far from the nest after incubation was completed. A great variety of insects and spiders were brought to the young and probably insect life constitutes the main part of the food of the young.

By one-thirty in the afternoon of August 2, the chick in the third egg could be heard peeping but had not yet pipped the shell. It had made no further progress when we left at dark but the next morning early it was out of the shell. The fourth and last egg was pipped by noon of the second day and hatched by night. The hatching of the four eggs from the pipping of the first egg to the emergence of the last chick required about forty-eight hours. The egg shells usually remained in the nest a few hours and then were carried away by the old birds. The chicks sometimes seemed to pick at the egg shells in the nest and appeared to eat particles of them. The sanitation of the nest was carefully preserved by the parent birds who ate the faeces of the young.

As previously mentioned the adults continued to bring grass when they relieved each other even after the young were hatched and about to leave the nest. On the first day that young were in the nest a very interesting incident occurred. About two o'clock in the afternoon one of the parents had just fed the young and was brooding them when its mate came up to the nest bearing a dead reed and relieved the sitting bird in the usual way. The young began to peep loudly for food and he (as we guessed at the sex from the bird's incompetence) rose and left the nest in search of it to silence their clamoring. Walking down the road a few feet he stopped irresolutely and began picking about in the water.

Then seeing a loose piece of reed about three inches in length, he seized it and walked confidently back to the nest. The chicks reached eagerly toward him and peeped loudly. Thereupon the old bird went through all the motions of feeding and held the particle before them as though it were food. They picked at it hungrily, but, of course, could do nothing with it. Seeing that they would not eat it he seemed satisfied that they could not be hungry and so he climbed on the nest and proceeded to brood them while they fairly screamed to be fed. This curious behavior was noted not once but several times during the first day and both sexes were guilty of this apparent confusion of instincts. We were in no doubt of what occurred for we were watching carefully at a range of barely three feet and clearly saw the bird hold the grass or leaf to the young just as it had done but a few minutes before with a bit of food.

The first egg hatched very early on the morning of August 2, 1925. On the morning of August 3 the older chicks began to leave the nest. This may have been hastened a few hours by our presence, but we believe they would have left normally before night at least. As it was, they became alarmed by our movements and one of the parent birds gave a peculiar note whereupon the three young scrambled from the nest leaving the fourth chick to complete its escape from the egg, which it did successfully. The young were very active and exhibited great ability in climbing over the tangled reed and grass stems in response to the calls of the parent birds. The outspread wings aided the young in balancing their tiny bodies and the little claw-like appendage at the tip of the manus of the wing was frequently employed in holding onto a stem or in climbing over an obstacle. As soon as they reached the edge of the grassy island the youngsters did not hesitate but plunged into water as readily as seasoned swimmers. They were very adept at swimming and made rapid progress in their attempt to escape to the grass and shrubbery of a larger neighboring island.

The nesting season of the Purple Gallinule in the Canal Zone is prolonged and perhaps continues throughout the year. Mr. Walter E. Hastings found a nesting pair at Barro Colorado Island in March, 1927 and the senior author found a pair of birds with

young in natal down near Frijoles, Gatun Lake on November 5, 1927. He also noted a pair of birds nesting on a banana plantation at Monte Verdi, Costa Rica during December, 1927. The gonads of two adult birds collected in the Canal Zone in November were of a size to indicate that they were sexually active. Three young birds collected the first week of November and many others observed during October and November were in juvenal plumage approximately three months old. It would appear from this observation that even though the nesting period is a prolonged one the majority of the birds in the vicinity of Barro Colorado Island nest during the months of July and August.

DESCRIPTION OF PLUMAGES.

Natal Down.—The young when hatched are covered with thick black down less thickly distributed in the region of the head. The down of the back is glossy black whereas that of the underparts is a dull or slaty black. The head is also thickly set with heavy gray bristles. In the freshly hatched young there are crisp white tips to the down of the back but this quickly frays away.

The colors of the iris and soft parts are as follows,—iris, chaetura drab; tarsus, vinaceous-drab; feet, light russet-vinaceous; claws, mouse gray; claw at tip of manus, white. The mandibles are very highly colored as follows:—base of maxilla, eugenia red extending forward to an irregular black line which runs through the nostril, bordering this black line in front is a band of pale livid pink, the remainder of the maxilla distal to the latter band is black except the chalky white egg tooth at the tip. The tip of the mandible (lower) is black, the base flesh pink with a narrow black band and one of hydrangea pink just posterior to the black of the distal end of the lower mandible. The distribution of these colors is so complex that it seems best to present an outline drawing of the bill with an indication of the colors.

Juvenal Plumage.—The following description of the juvenal plumage is based on two male specimens collected near Frijoles, Canal Zone, November 5, 1927.

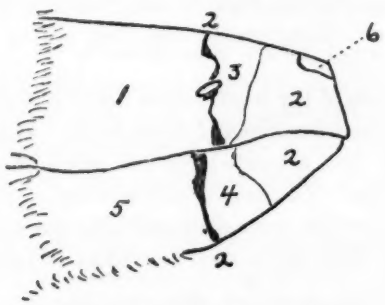
Upper parts. Crown and nape olive-brown shading to a light tawny-olive on the sides of the head. Back of the neck and scapular region deep olive-green. Lower back, rump and upper

UPPER.—PURPLE GALLINULE APPROACHES NEST WITHOUT FOOD. YOUNG JUMP UP TO GRASP BILL.
LOWER.—PAUSES TO INSPECT BLIND BEFORE GOING TO NEST.

tail coverts clove brown; tail feathers olive-brown without the gloss of green present in the adults; feathers at bend of wing and outer vanes of coverts Niagara green; outer vane of primaries grape green with metallic green reflections.

Lower parts. Chin and throat and undertail coverts white; breast and sides of belly tawny-olive shading to iron gray on the flanks; middle of belly white tinged with olive-buff. Some of the juvenals have white extending well up towards the region of the breast.

Another specimen collected November 5, 1927 was in a state of transition from the juvenal to the first winter or adult plumage.



BILL OF DOWNY NESTLING.

1. Eugenia red.
2. Black.
3. Pale livid pink.
4. Hydrangea pink.
5. Flesh pink.
6. White.

In this bird the upper parts are similar to those described for the juvenal above. The throat and chin are white but the breast is a mixture of new and old feathers, the Windsor blue feathers predominating especially in the region of the breast. Many of the black feathers of the belly and legs characteristic of the adult plumage have made their appearance. The under tail coverts are pure white.

The colors of the iris and soft parts of the birds in juvenal plumage are as follows,—iris, sayal brown; bill, grape green shading to vinaceous-drab at the base; frontal plate, neutral gray; tarsus, dark olive-buff; toes, olive-ochre; nails olive-buff. These

colors in the bird representing a transitional state of plumage described above are as follows,—iris, pecan brown, maxilla tip, deep chrysolite green, base of maxilla, sorghum brown; base of mandible, russet-vinaceous; tip of mandible deep chrysolite green; frontal plate, dark glaucous-gray, tarsus and toes similar to that of the juvenal.

Adult.—The description of the adult Purple Gallinule is well known but it seems desirable to record the color determinations of the iris and the soft and naked parts which quickly change color after death. The following descriptions are based on the examination of one female and three male adult birds collected in the Canal Zone. Iris, Hay's russet; the distal 12 mm. of the bill, light viridine yellow, base of bill, jasper red; frontal plate, light forget-me-not blue; tarsus and feet, amber yellow; claws, naples yellow.

The bright colors of the frontal plate and bill are most conspicuous features in the colorations of these birds. It was these parts which invariably first attracted our eye when observing them in the grassy marshes. The bright yellow color of the legs and the white under tail coverts were distinguishing marks which we used to identify these birds when they flew away in front of us.

WEIGHTS AND MEASUREMENTS.

The weights are given in grams and measurements in millimetres. Specimens in Bowdoin College Collection.

Young in natal down age one day. Taken from the nest on Barro Colorado Island, August 4, 1925.

Weight	10.7 grams	10.6	10.7	12.2
Length	98 mm.	97 mm.	96 mm.	96 mm.
Bill	11.5	11.3	11.1	10.9
Extent	98	97	98	92
Wing	22	22	21	21.5

	Juvenals.			Adults.			
Sex	Female	Male	Male	Female	Male	Male	Male
Date	Nov. 5	Nov. 5	Nov. 5	Jul. 28	Oct. 21	Nov. 5	Nov. 15
Weight	141.7 gms.	229.9	218.4	190.3	203.7	229.2	269.0
Length	312 mm.	335	315	295	299	327	345
Tail	71 "	75	69	71	74	72	82
Bill	43 "	43	46	47	45	48	51
Extent	547 "	571	532	539	550	568	594
Wing	170	181	171	171	176	181	192

FOOD.

The following notes on the food of the Purple Gallinule are based on an examination of the stomach contents of the three juvenal and four adults. The stomach contents of female number 44 collected July 28, 1925, on Barro Colorado Island weighed 4.6 grams. The food was chiefly animal matter, for the determinations of which we are indebted to F. M. Gaige of the University of Michigan. The contents were as follows,—

3 adult aphids.
3 grasshoppers.
1 moth.
12 fly larvae (8 *Chironomus*, 3 syrphid).
2 beetle larvae.
5 spiders.
1 small hemipteron.
1 tick.
3 small crustacea.
10 small ants (*Ponera opaciceps*).

In addition to the above animal matter there was some fine gravel and small brown seeds we could not identify.

The stomach contents of male number 90 collected near Balboa October 21, 1927 contained parts of seven water beetles, a small amount of vegetable pulp and a few grains of gravel making a total of 5.2 grams.

A male number 91 collected at Frijoles on Gatun Lake, November 5, 1927 contained vegetable matter, chiefly seeds, and a few grains of gravel. The total weight of the contents was 2.2 grams.

An adult male number 109 collected at Frijoles on November 15, 1927 had stomach contents weighing 4.7 grams. The food consisted of grass, grass seeds and vegetable pulp. There was also a dozen grains of gravel.

The stomach contents of three juvenals 2 males and 1 female collected November 5, 1927 consisted of vegetable matter, chiefly seeds and vegetable pulp, and small amounts of gravel. The weights of the contents were 2.9, 3.9 and 2.3 grams respectively.

Mr. A. C. Bent[1] states "very little has been published about the food of the Purple Gallinule—Probably they live chiefly on grains, seeds, and other vegetable food but there is some evidence that they also eat snails and perhaps insects."

Judging from our field studies on the feeding of the young and the stomach contents of two adults collected in different parts of

[1] Bent, A. C., 1926, U. S. Nat. Mus. Bull. 135, p. 343.

the Canal Zone it is reasonable to infer that insects constitute an important part of the food of the Gallinule in the Tropics. It is also apparent that they are adaptable to both vegetable and animal food. As in the case of most grain and vegetable eating birds the young are given, at least in the beginning, chiefly an animal diet.

Bowdoin College, Brunswick, Me.

University of Michigan, Ann Arbor, Mich.

UPPER.—YOUNG PURPLE GALLINULES POSED IN NEST AFTER FOURTH EGG HAD HATCHED. AUGUST 4, 1925.

LOWER.—AUTHOR'S BLIND, WITH SHEET METAL FOR ROOF AND PLANTAIN LEAVES FOR SIDES. WATER LEVEL NOW ABOVE WOODEN PLATFORM; YOUNG HAD LEFT NEST THREE DAYS BEFORE.

MARK CATESBY AND THE NOMENCLATURE OF NORTH AMERICAN BIRDS.

BY WITMER STONE.[1]

UPON this occasion, the first meeting of the American Ornithologists' Union in the South, it seems eminently fitting that we begin our program by paying homage to the writer whose classic work on the Natural History of Carolina, Florida and the Bahama Islands forms the basis of the ornithology not only of the Southern States, but of the whole of North America—Mark Catesby.

When, some forty years ago, I became connected with the Academy of Natural Sciences of Philadelphia, there was a case in the library just beyond the door of my room, which contained, among other things, two large white parchment covered folio volumes marked 'Catesby's Carolina.' My curiosity as to their contents was aroused and I was soon enjoying my first glimpse of Catesby's quaint paintings of South Carolinian birds. Many times since then have I turned those pages and become familiar with the dead Robin, lying on its back on a stump; the brilliant Cardinal, standing painfully erect against the trunk of an oak tree and the Towhee, walking flat footed over the upright leaves of a poplar with as much apparent ease as a Jacana treading the lily pads on some tropical pond!

Catesby says of himself "I was not bred a painter and I hope some faults in perspective and other niceties may [therefore] be more readily excused." And when we learn that he carried his sheets of paper and his paints in a box, during all his travels among the Indians in the mountains of South Carolina, in order to depict his birds on the spot; and that he later learned to etch after a fashion, so that he could make his own plates and reduce the cost of his publication, we can indeed be most lenient. Even though his colors are often too intense and little details such as tail-markings and wing-bars are omitted, his plates have a charm that is all their own and almost all of them are specifically identifiable.

[1] Read at the opening session of the Charleston Meeting of the A. O. U. November 20, 1928.

His quaint text, too, printed in English and French in parallel columns, is fascinating reading, and many a time have I poured over the large type as fresh on the fine old sheets of the letter press as if printed but yesterday. Here we may read the story of the Osprey and the Eagle in probably its first presentation: "The manner of fishing of the Fish Hawk" says Catesby "after hovering a while over the water is to precipitate into it with prodigious swiftness where it remains for some minutes and seldom rises without a fish which the Bald Eagle, which is generally on the watch no sooner spies, but at him furiously he flies. The Hawk mounts, screaming out, but the Eagle always soars above him and compels the Hawk to let it fall which the Eagle seldom fails of catching before it reaches the water."

Of the Flicker he writes: "it differs from Woodpeckers in the hookedness of its bill and manner of feeding which is usually on the ground, out of which it draws worms and other insects." Catesby apparently saw the long retractile tongue of the Flicker licking up ants and took it for an earth worm while his contrasting it with the Woodpeckers led Linnaeus to place the bird in the Cuckoo genus.

In his account of the Blackbirds Catesby says that the Redwings and Grackles mingle in the same flocks and tells us that "when they are shot there mostly falls both kinds and before one can load again there will be more than before they were shot at;" a condition which recalls the miracle of the loaves and small fishes.

The Reed-bird we learn was esteemed in Carolina "as the greatest delicacy of all other birds. When they first arrive they are lean but in a few days become so excessively fat that they fly sluggishly and with difficulty." "In September," he naïvely adds "when they arrive in infinite swarms to devour the rice, they are all hens not being accompanied by any cock but early in the spring both cocks and hens make a transient visit together."

Of the gorgeous green Parakeet which was common in Carolina in those days he gives us the surprising information that "their guts is certain and speedy poison to cats."

Now Catesby was primarily a botanist and dabbled in ornithology just as some ornithologists of today dabble in botany, so

we must forgive him if he did not take more time for a detailed study of the habits of his birds and incorporated in a scientific treatise these pieces of popular belief, tradition, and folk lore, and we should rather thank him for producing at tremendous labor the first recognizable series of colored plates of American birds, each accompanied by a spray of some characteristic Carolinian tree, shrub or herbaceous plant—a plan followed nearly a century later by Audubon as well as by other bird artists.

But who, by the way, was this Mark Catesby? Not a South Carolinian; not even an American born, but a young Englishman, who at the age of thirty-two visited Virginia where he lived for seven years and later at the age of forty-two spent four years in South Carolina, landing at Charleston, spending a year in the coast district, and then some time at Fort Moore which he says was located some 300 miles up the Savannah River, whence he made journeys with the Indians into the mountains of upper Carolina. Unfortunately he left us no detailed itinerary.

He returned to England in 1726 where his great book was published and died at his home in London in his seventieth year, on December 23, 1749.

Now how does Catesby's "Carolina" affect the nomenclature of North American birds? I hesitate to mention such a subject as nomenclature at a meeting of the Union. It is likely to cause the hasty departure of part of my audience and to arouse those who claim this subject as their chief indoor sport to continued debate, but I hope I may be spared from either of these calamities. I have endeavored to lure on my audience by presenting a brief historical account of Catesby and his work and covered the bitter pill of nomenclature, as it were, with a sugar coating. Instead of starting a weary debate I shall try to propose a compromise which may be considered carefully and adopted or rejected by the members of the Committee on Nomenclature who are now laboring on the new Check-List.

Catesby tells us that he named his birds after the English birds "with an additional epithet to distinguish them" and many of his vernacular names still persist. Since he tells us that his friend and patron, Dr. Sherard, supplied Latin names for the plants it is reasonable to suppose that he performed the same service in

regard to the birds. We must remember, however, that Catesby lived before the publication of Linnaeus's 'Systema Naturae' which in 1758 laid the foundation for modern scientific nomenclature and that Catesby's names were polynomial descriptive terms quite different from the binomial system of Linnaeus. His name for the Red-winged Blackbird, for instance, was *Sturnus niger alis superne rubentibus;* his Blue Jay was, *Pica glandaria caerulea cristata* and his Robin *Turdus pilaris migratorius.*

Such names were of course not admissible under the binomial Linnaean system and had no direct bearing on nomenclature but they had a very decided indirect influence, through the work of Linnaeus.

Linnaeus was, by the way, another botanist who merely dabbled in ornithology. He gave binomial names to all of the plants, and starting on the animal kingdom named first the Swedish birds and other animals with which he was more or less familiar, while the foreign species, which he had never seen, he named from the plates in published works, and Catesby became his basis for the North American species. Moreover he often selected some descriptive word from Catesby's polynomial names in coining his own binomials, such as "*migratorius*" for the Robin; "*cristatus*" for the Blue Jay; etc.

So far so good, but in the course of time American ornithologists studied their birds more carefully and discovered that many of the wide-spread species of the eastern states were divisible into two geographic races or subspecies, a northern and southern. They usually compared specimens from Florida with those from the Middle States, which often differed markedly from one another and taking it for granted that the Linnaean names, based on Catesby, belonged to the northern form they named the Florida birds as new and so there came into our list such birds as the Florida Grackle (*Quiscalus quiscula aglaeus*), described by Prof. Baird; the Florida Redwing (*Agelaius phoeniceus floridanus*) described by Mr. Maynard etc. Specimens were then often not available from the Carolinas and Virginia, where the two forms might be supposed to merge into one another and it did not occur to these early systematists that there might be some question as to whether Catesby's plates, upon which Linnaeus based his names,

represented the southern and not the northern race. It was not realized either that many of the so-called "Florida races" extended northward along the coast as far as Charleston or even further and that Catesby might just as likely have had in hand a Florida Grackle when he painted his Purple Jackdaw, as an example of the more northern Purple Grackle. This especial case has been clearly brought out by Mr. Arthur T. Wayne, who, after Catesby, is our most notable South Carolinian ornithologist, and Mr. Outram Bangs took the question seriously under consideration when he separated the Flicker into a northern and southern race. The latter decided that the birds from about Charleston, which he considered as the type locality for Catesby's plate, were more like the southern form than the northern and consequently named the latter as new, *Colaptes auratus luteus*, the Northern Flicker, and allowed the old Linnaean name *auratus* to stand for the *southern* race—exactly the reverse of what Baird and Maynard had done in the case of the Grackle and Redwing.

The next step was taken by Dr. Mearns and Dr. Oberholser who in order to be consistent made Charleston the type locality for all of Catesby's birds and overthrowing the work of Baird, Maynard, Coues etc. transferred the names formerly applied to the northern races to the southern ones and renamed the former, so that *Cyannocitta cristata cristata* which a short time ago denoted the Northern Blue Jay would now denote the Florida Blue Jay, while the name *florincola* proposed by Coues for the latter disappears and a new term *bromia* is introduced for the northern bird. This is confusion worse confounded and seems the height of nomenclatural absurdity to the uninitiated, yet if we restrict all of the Catesbian-Linnaean names to the southern races there is no other recourse and Drs. Oberholser and Mearns were perfectly right and were playing the game "according to Hoyle."

Then comes another move. Dr. Mearns had in accordance with the principles just explained, cancelled the name *floridanus*. for the Florida Redwing and transferred to it the name *phoeniceus* formerly applied to the northern race, considering that his specimens from the Charleston region were closer to the southern form. Now Messrs. Howell and van Rossem studying again the selfsame series that had been used by Dr. Mearns decide that they

are closer to the *northern* form of Redwing and the names shift back to where they were before. And so it is in other cases. We find Mr. Ridgway stating that the intermediate Blue Jays of the Carolinas are closer to the northern form while Dr. Oberholser considers them identical with the southern.

In other words South Carolina is in the middle of a broad area of intergradation and its birds are more or less intermediate between the northern and southern forms. And with Charleston fixed as the type locality of the Linnaean-Catesbian names we find that according as we draw the arbitrary line of separation north or south of Charleston the names shift back and forth. So intermediate too are the characters of the birds from this "no man's land" that their relegation to one form or the other and the location of the dividing line become wholly matters of personal opinion. Some authors claim to find in Catesby's more or less crude plates indications of one race or the other, but others as vehemently deny this possibility and it seems hopeless to reach any decision from either plate or text except in a few cases which have never been in debate, such as the Towhee, which is depicted with a red eye and *must* be referred to the northern bird which comes south in winter. From his statement that it is resident, however, it is obvious that Catesby had not distinguished the two forms, nor did he in any other case where a northern and southern race exist.

Had Mark Catesby only realized what trouble he was making for us of this enlightened age 200 years later, he would probably have landed at St. Augustine or Norfolk or somewhere else safely within the typical range of one group or the other, but NO!, on second thought he doubtless, like us, realized the attractions of the Charleston environment and the hospitality of its citizens and cast all other considerations to the wind!

But those of us who are burdened with the responsibility of preparing the new A. O. U. 'Check-List' and who wish to reach decisions as permanent as possible have to find some solution to problems like these, and I now offer my suggestion.

It seems very easy and consistent to fix Charleston as the Catesbian type locality for all his birds but are we justified in such action? I think not. And as it results in such unfortunate overthrows as I have cited I do not think it is desirable.

We find that we pass into the range of the northern races as we go north along the coast and we do the same as we go west toward the mountains, as it has been shown by Mr. Wayne and by Mr. Pickens that the northern races often occupy the highlands of the state. Moreover some northern races occur in winter in South Carolina even on the coast. We have no way of telling positively where in the state Catesby got all of his specimens nor at what season, while we do know that he travelled well back onto the uplands, and presumably got his specimens in winter as well as in summer (*vide* the Towhee).

Now why cannot we allow the type locality to stand at the rather indefinite statement "Carolina" just as he left it and follow the first revisor of the species as to whether the Catesbian bird represents the northern or southern race? Why make a positively definite statement which the evidence does not warrant and which overturns the good work of our predecessors?

Dr. Coues named the Florida Blue Jay *Cyanocitta cristata florincola* and left the Linnaean-Catesbian name *cristata* for the *northern* race, very good.

Mr. Bangs named the northern Flicker *luteus* and left the Linnaean-Catesbian name *aureus* to the southern race, very good again.

Let them both stand and forever avoid the constant difference of opinion as to which form Catesby actually had in hand. By this plan we reduce personal opinion to a minimum, we do no injustice to Catesby nor to South Carolina, and we retain for our earlier systematists credit due them for being the first to recognize the existance of the two forms of these various birds. Furthermore it makes it possible for me to once again open the classic volumes of the Natural History of Carolina and enjoy an examination of Catesby's paintings and a perusal of his quaint text without the horrible nightmare that I may discover some peculiar tint in his coloring or some hitherto overlooked word in his diagnosis that will open the way to another overturn in the names of these unfortunate birds of our south Atlantic Coast.

In conclusion I would thank my audience for bearing with me while I led them unknowingly into the mazes of a nomenclatural problem and I would assure my fellow laborers in nomenclatural

fields that I have no criticism of what they have done and have merely suggested a way out of our troubles, ever endorsing the byword of our 'Check-List', coined I believe by Dr. Elliott Coues, that "Nomenclature is a means, not an end, of Zoological Science."

Academy of Natural Sciences,
Philadelphia.

THE NEST AND HABITS OF THE CONNECTICUT WARBLER IN MINNESOTA.

BY N. L. HUFF.

Plates XXV–XXVI.

THE Connecticut Warbler (*Oporornis agilis*) is one of the rarest of our song birds. It was first collected by Alexander Wilson in Connecticut, and notes concerning it were published in 1812.[1] It is seen not infrequently during migration seasons, mainly restricted to the Mississippi river valley in spring and occasionally beyond, and to the Atlantic slope in autumn, but comparatively little is known or has been published of its home life and habits.

For more than seventy years after the bird was described, its summer home was shrouded in mystery, and not until 1883 was the mystery partly cleared, when Ernest T. Seton[2] discovered the first nest in a cold boggy tamarack swamp in Manitoba. He made no extensive study of the habits of the bird, and so the domestic life of this rare songster was left in obscurity. Other records of its summer residence are few, and the nest to be described in this paper is probably the first ever discovered within the bounds of the United States, certainly the first recorded from Minnesota.

O. B. Warren[3] collected young Connecticut Warblers in early August, 1894, in Marquette County, Michigan. Norman A. Wood[4] reports the taking of an adult and young on July 27, 1904, in Ontonagon County, Michigan, and O. M. Bryens[5] reports mature birds seen July 23, 1922, August 18, 1923, and August 22, 1924, in Luce County, Michigan. These summer records, especially of immature birds, may be taken as good evidence of breeding in the upper peninsula of Michigan.

It has been known for many years that the Connecticut Warbler is a summer resident of northern Minnesota. B. T. Gault[6] saw

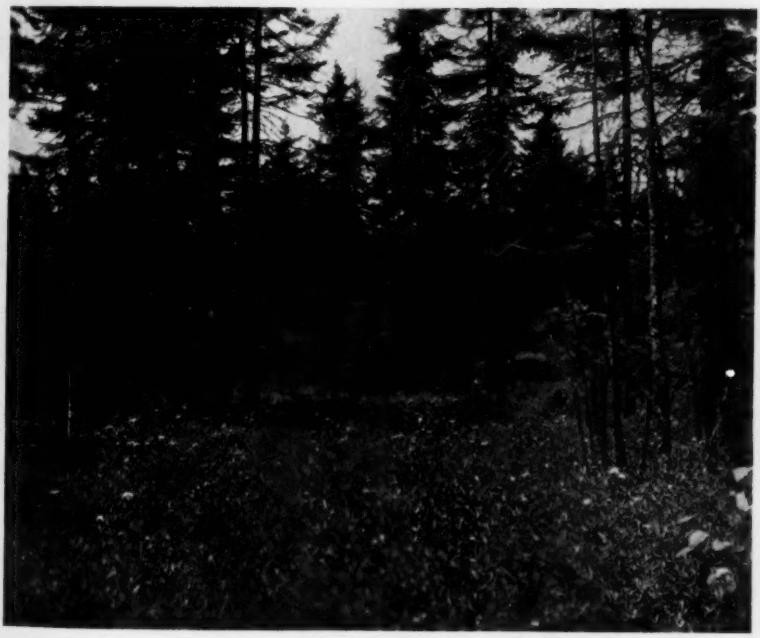
[1] Amer. Ornith., V, 1812.
[2] Auk, I, 1884, 192.
[3] Auk, XII, 1895, 192.
[4] Auk, XXII, 1905, 178.
[5] Auk, XLII, 1925, 451.
[6] Auk, XIV, 1897, 222.

one and heard several others singing in a swamp in Aitkin County on June 21, and days following, 1896. Dr. Thos. S. Roberts and L. L. Löfström[1] saw adults, one a female with bill full of food, on June 26, 1915, in a swamp in Isanti County, and Mr. Löfström considered the bird as "a common summer resident of these tamarack and spruce bogs." Although I have visited the Isanti County bogs referred to, each June and July for the past five years, I have neither heard nor seen the Connecticut Warbler there, and it is believed they have left the swamps of this county permanently for the wilder regions in the northern part of the State, or in Canada.

My search for the nest of the Connecticut Warbler began several years ago, as a result of a suggestion from Dr. Thos. S. Roberts, whose interest, enthusiasm, and personality have always been a stimulus for more intensive study of bird life. It was on July 13, 1925, that I made my acquaintance with the bird in its summer home. On this date I was driving through St. Louis County and while passing a spruce swamp some miles from Tower, I heard an unfamiliar bird song coming from the depths of the swamp. I entered the swamp and in a few moments had located the tamarack tree where the singer was perched. In spite of the fact that the tree was small and its foliage sparse, it was an hour before I was able to get an unobstructed view of the bird that enabled me to identify him definitely as the Connecticut Warbler. During this time he was forced to change his location two or three times but each time he eluded his observer and concealed himself in his new station before renewing his song.

The song of the Connecticut Warbler varies with different individuals, and at times with the same individual. The volume may be changed, and certain syllables may be changed or omitted, but the quality of his tone is unique and practically invariable, especially as regards two syllables, "*freecher,*" always included in his song. So characteristic is his voice that one having heard him may identify him more quickly by his song than by sight. His voice is sharp, piercing, penetrating, rather shrill yet pleasing, and is one that I always associate with the wild swampy wilderness where he sings. As with many other birds it is impossible to

[1] Auk, XXXII, 1915, 504.



UPPER.—NEST AND EGGS OF CONNECTICUT WARBLER (*Oporornis agilis*).
LOWER.—NEST SITE IN SPHAGNUM AND LABRADOR TEA.

express it with words, but his most common song suggests the syllables, *freecher-here freecher-here freecher-here freech.* Occasionally I have heard the song, *freecher freecher freecher,* resembling somewhat that of the Ovenbird, but often followed by other notes, and so different in quality that one would never confuse the two. Frequently only a fractional part of either song is voiced.

In his summer home the Connecticut Warbler is a shy and elusive bird, so secretive in his manner that he would rarely be seen here, even by those looking for him, were it not for his betraying song. As we near his territory we hear his clear, ringing, unmistakable voice. One may easily approach the tree from which he pours forth his jubilant song, for he seems to sing with even greater vigor as we near him; but to see him may require a long wait, and the closest scrutiny of every part of the tree's crown. His voice has something of a ventriloquial quality. As one circles slowly about the tree from which he sings, the song may apparently come from the lower branches, five or six feet from the ground, while in reality the singer is situated thirty feet or more above. He continues to sing with vigor, but his olive green back and yellowish under parts blend with the leaves, and he cautiously keeps a branch or a small mass of foliage always between him and his would-be human observer. The art of concealing himself behind a relatively small obstruction, is one which he has developed to a degree approaching perfection. Little wonder the records of his summer life are so few.

When driven from his song perch by too close approach of his observer he escapes, often unseen, from the opposite side of the tree, and the first indication of his departure may be his jubilant, triumphant song gushing from a tree several yards away. If one is fortunate enough to see him enter another tree nearby, one is impressed with the remarkable facility with which he creeps, half hidden, through the tree until he reaches a secure position, separated from his observer by a limb or a small mass of foliage. More than once as he scampered along a branch, his body low, his head extended, seeking a suitable hiding place, I have seen him pause an inch beyond the coveted spot. With head and shoulders visible he takes a hasty peep at his observer, then suddenly retreats a step or two and

adjusts his position until he is wholly obscured. Here, frequently on a relatively large branch not far from the trunk of the tree, he at once begins his oft repeated song, *freecher-here freecher-here freecher-here freech.* Whether this is a love ditty to his mate, a warning to other members of his tribe that this territory is occupied, or simply an uncontrolled outburst of the exuberant joy of living, who can say? Whatever his motive, he seems quite oblivious to the presence of a human observer so long as his form is hidden among the branches.

If one remain perfectly still or in hiding for a while, the singer forgets one's presence and sooner or later will move out of his hiding place, walking along on a limb or occasionally hopping to a nearby branch, taking some tiny insect or other tidbit that meets his fancy, all the while repeating his song several times each minute. His relative inactivity, his rather slow deliberate movements, now afford an excellent opportunity for observation.

On June 6, 1926, on June 4, 1927, and again on June 3, 1928, while on botanical excursions through northern Minnesota, I heard or saw, on each occasion, Connecticut Warblers in certain swamps of Aitkin County. Of these swamps, one was selected as the most promising place for observation of the habits, and the possible location of a nest of this bird. This swamp is perhaps half or three-quarters of a mile wide and two miles or more in length. Much of its area is covered with a pure stand of small black spruce, some parts with an equally pure stand of tamarack, but in places these two species are more or less mixed together. The pitcher plant and the sundew thrive here, as do the buckbean and the wild calla, the coral root, the moccasin flower, and that rare and gorgeous orchid, the dragon's mouth (*Arethusa bulbosa*).

In the Canadian swamp where Seton[2] found the Connecticut Warbler nesting, he speaks of the song of this bird being the only noticeable sound save that of the Great Crested Flycatcher. How different this Aitkin County swamp! Here on a clear morning in June the air is filled with bird voices. One hears the Hermit Thrush, the Willow Thrush, the Song Sparrow and the White-throat, the Maryland Yellow-throat, Blackburnian and Palm Warblers, four or five Flycatchers, Chickadees, Juncos, and several others, to say nothing of songs of the Scarlet Tanager, Rose-breasted Grosbeak,

Oven-bird, and Vireos that drift in from the borders of the swamp. It is a place attractive alike for the student of plant life and the lover of birds. Recent explorations (1929) of only a part of this swamp revealed Connecticut Warblers singing in no less than five different localities, and there are probably several more than that in the entire swamp.

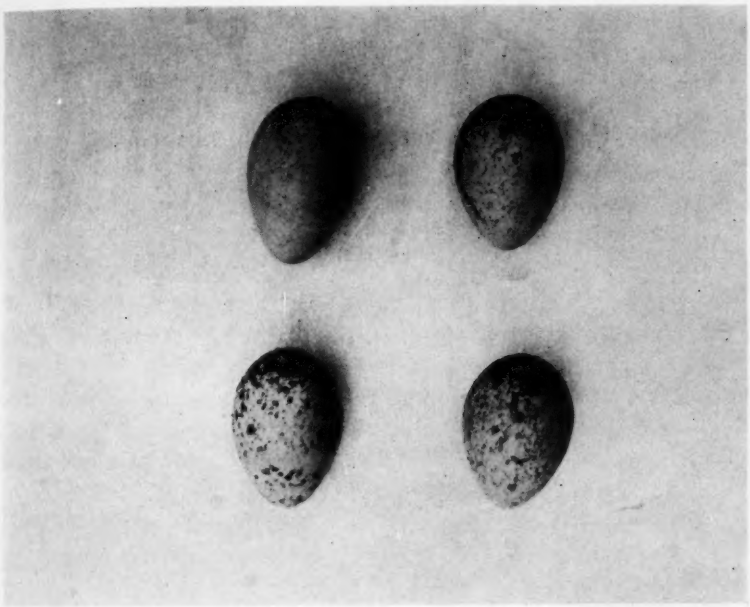
On June 10, 1928, I visited this region for the purpose of learning more of the Connecticut Warbler and if possible locating a nest. Scarcely had I entered the swamp when I was attracted by the song of this bird, and while observing it, another was heard some 150 yards away. The first was lost in a very short time and I advanced to locate the second singer. The tree from which he was singing, a tamarack 35 or 40 feet tall, stood amidst the growth of smaller black spruce. The foliage of the tree was not dense and it seemed improbable that any bird of his size could long conceal himself there, for the powerful binoculars revealed every twig. The song offered constant assurance of his presence but the bird could not be seen, and after circling about the tree two or three times, assured of his approximate location, I settled down for a more complete search with the field glasses. Fully fifteen minutes had passed when he appeared, walking out on a branch near the trunk of the tree, but 30 feet above the ground. At the base of a nearby tree, I sat perfectly still, in a tangle of Labrador tea and soft bog moss. Whether he had forgotten my presence or merely regarded me now as a part of the landscape, I do not know, but he no longer sought to conceal himself. He often sat motionless for several minutes, except for the shaking and quivering of his body which always accompanied his singing. Sometimes he flitted about on smaller twigs near the outer part of the crown, but most of the time he spent near the center, walking along branches, deliberately searching for insects, occasionally snapping at one as it flew too near his head, but repeating his short song in a vigorous manner, about every twelve seconds. For an hour I kept him under almost constant observation, hoping he might give some clue as to the whereabouts of a nest. But not he; if he held the secret he failed to reveal it.

While the growth of spruce in some parts of the swamp was so dense as to be almost impenetrable, this place was more open and the trees were well spaced. A layer of sphagnum several inches in

depth covered the ground. Growing through this and extending from 15 to 18 inches above it was a veritable tangle of Labrador tea and swamp laurel, a combination that at times makes human progress extremely difficult. In spite of the difficulties however, a thorough search was made in the vicinity, an area extending from 50 to 150 yards in all directions from the song-tree, but no evidence of a nest could be found. At one time while the male was singing from his usual place, another bird was heard at a distance of about 100 yards. The song was different from that of the male, softer and shorter, *freecher, freecher,* followed by several other notes. I located the bird in a small spruce tree and identified it as a Connecticut Warbler, probably a female, since the markings were less pronounced than those of the male I had been watching. She repeated her song only a few times and was then lost in a spruce thicket. Later in the day a thorough search in the vicinity of this tree failed to flush any bird or give further indication of a possible nest.

For more than five hours, while I remained in the vicinity, the singing male clung quite persistently to this one tree, and during this time, so far as I was able to observe, he left the tree only three times. Once, for a moment only, he went to the ground, and on two other occasions he flitted across to a neighboring tree, only to return in two or three minutes. All the while he repeated his song at short intervals, only occasionally pausing for a rest of five or ten minutes. When I moved about near his tree he always tried to conceal himself, and his song was issued in a Thrush-like manner, from a single perch where he might remain for a long time. At other times however, his manner was more like that of the Vireos. He walked or flitted about the branches in a deliberate manner, industriously getting his meal, but always singing while he worked. From several Connecticut Warblers observed before and after this one, it appears not uncommon for a bird to remain in one tree for fifteen minutes or even for half an hour, but I have observed none other that clung persistently to the same tree for several hours. Practically all have shown a decided preference for the tamarack, even where the majority of trees present were black spruce.

About three weeks later, July 4, 1928, I was in this swamp again for several hours, but failed to see or hear a single Connecticut



UPPER.—EGGS OF CONNECTICUT WARBLER.

LOWER.—CHARACTER OF COUNTRY WHERE NEST WAS FOUND. PHOTO FROM FORESTER'S OBSERVATION TOWER. DARK BELT, BLACK SPRUCE; LIGHT BELT ABOVE IT, SMALL TAMARACKS.

Warbler. I concluded that either the young had left the nest and they had moved on to other feeding grounds, or that the males had ceased their singing. On account of their secretive manner the presence of Connecticut Warblers in a swamp of this kind would be extremely difficult to determine, were it not for the tell-tale song of the male.

On June 13, 1929, I paid another visit to this region, and at 8:30 in the morning as I entered the swamp, was greeted by the voice of a Connecticut Warbler singing from a tamarack tree near the edge of the bog. After listening to him for a few moments I moved on toward the tree where I had observed the singer for several hours in 1928, a place only 300 or 400 yards away. I had covered about half this distance and was wading through a tangle of Labrador tea and other bog shrubs that covered the ground in a little opening among the spruce trees. As I reached the center of this opening there was a slight flutter in the tangle at my feet. I paused, and like an arrow speeding from a bow, a bird with olive green back flashed from the tangle and disappeared in the thicket of black spruce. A Nashville Warbler, I thought, from the flitting glimpse I got of the bird as she left the nest. I turned my eyes to the ground and there at my feet, sunken in a mossy hummock, was an open nest with four speckled eggs, but they were evidently not those of the Nashville Warbler. From the meager description I had read of the Connecticut Warbler's nest discovered by Seton[2] this might be the long sought nest. Could it be possible? Patience, and the female bird will answer the question.

I retreated a dozen paces and partly concealed myself where I could see the nest. In about ten minutes a bird appeared in the low branches at the edge of the opening where the nest was located. She was aware of my presence and evidently annoyed. Her actions clearly proclaimed her to be the owner of the nest. One look through the glasses and her identity was certain. It was a female Connecticut Warbler. The nest had been found at last! She disappeared in the thicket and I retreated to a point 20 yards from the nest. In a few moments she reappeared in a tree some 20 feet above the ground and beyond the nest from where I sat. She was much distressed and called repeatedly in a loud metalic tone, *plink, plink, plink,* but I sat like a pillar of stone. After a few moments

she came to a tree nearly between me and the nest and continued her protest at my intrusion, but her note had now changed to a soft, plaintive, *p-e-e-p, p-e-e-p*, given in a clear flute-like tone. Like the males I had previously observed, she often concealed herself among the foliage, even while she protested with her gentle voice. On two occasions while in this tree, but for the moment invisible from where I sat, I heard the short song, *freecher freecher freech*, issuing from the tree, and it unquestionably came from this female bird.

After nearly half an hour of mild protest, from a height of 20 feet, she began to move gradually upward in the tree. Her voice was now still, and walking or creeping through the rather dense foliage, she disappeared near the top of the tree. When I had waited for about ten minutes without seeing or hearing her again, I decided to leave the place for a while to permit her to return to the nest, lest she might desert it before our evidence had become absolutely conclusive. As I approached the nest to take another look at the rare structure and eggs I was greatly surprised to flush the mother bird again from the nest. As before, she darted directly into the thicket and was lost from view. Evidently she had cautiously left the tree from the opposite side, and at a point some distance away had descended into the tangle of Labrador tea and made her way along the ground back to the nest.

For two hours I explored the swamp and then returned and very cautiously approached the nesting site. At a distance of ten feet from the nest I was able to see the bird sitting low in her deep little cup, her back well below the top of the nest, her beak and tail pointing straight upward, her white eye-ring standing out in strong contrast against the darker background of her head and eye. I paused to observe her, but it was for only a moment. Seeing me, she slipped from the nest, scudding like a mouse over the rough surface of bog-moss, and creeping swiftly through the tangle of low shrubs, she was fifteen feet from the nest before she left the ground. She then arose to the lower branches of a small spruce tree, and by creeping from twig to twig, gradually ascended until ten or fifteen feet from the ground when she disappeared. Unlike the bird described by Seton[2] she made no effort to entice me away from the nest, but each time vanished as quickly as possible in the nearest cover.

When I had taken photographs of the nesting site and nest, I withdrew 25 yards, hoping to make some further observations of the female bird. Although I remained there for an hour she failed to appear, nor was she at the nest. After wandering about the swamp for nearly two hours I returned but she was not there. I was away for another hour, but still there was no bird at the nest. In photographing the nest, the eggs had been left near one side of the little cup and I now noted that their position was unchanged. Evidently the mother bird had not been at the nest for more than four hours. Had my prolonged stay in photographing, caused the shy bird to desert her nest? I feared it had. In my own mind I was absolutely certain of the identity of the bird I had seen, but I had no evidence convincing for others, that the nest and eggs were the long-sought prize, those of the Connecticut Warbler.

When I left home on a 300 mile tour to visit this swamp I had a feeling that somehow I should find there the rare nest of this bird, and so I went prepared to bring back the evidence of my discovery. If now the bird would only return once more to the nest I should have the convincing evidence. But had I delayed too long? Half discouraged and half hoping, I took from my knapsack a cap-shaped hair net attached to a wire hoop eight inches in diameter. This I suspended six inches above the little nest. The light line suspending the net passed through a small metal ring four feet above the ground and directly over the nest, and was then attached to a tree 25 yards away. A light weight attached to the line just below the metal ring and secured in a manner to prevent it from dropping to the nest, insured quick action when the line was released.

I went for another tour of the swamp. I had little hope that the mother bird would return to the nest after an absence of five or six hours. As I wandered about the swamp my anxiety for the contents of the nest was constantly increasing, for I could not but contemplate what would happen if a red squirrel that frisked about within ten feet of the nest while I watched, should find the eggs before my return. An hour and a half passed and at 5:30 in the afternoon I returned, cautiously approached the tree 25 yards from the nest and released the line suspending the net. The net dropped. I rushed toward the nest, lest if the bird were there she should

break the net or struggle through it before I reached her. I half hoped to see a bird fluttering in the net. At ten feet from the nest I paused. Alas, alas! There lay the net neatly spread upon the moss above the nest, but no fluttering bird. With disappointed eyes I gazed into the nest. What! A beak and tail pointing upward, a white eye-ring, just as I had seen them earlier in the day! Can it be possible? I started to rub my eyes, but just then there was a commotion in the nest; there was a bird fluttering in the net and it was the Connecticut Warbler! So fine and light was the net and so gently had it fallen upon the soft moss that the sitting bird had not been disturbed, and made no effort to leave until I approached to within eight or ten feet of her nest. I now had the nest, the eggs, the bird, and the evidence was complete.

The spot chosen for the nesting site was a little opening among the black spruce trees, not more than 30 yards from the margin of the swamp. A luxuriant growth of sphagnum covered the ground everywhere to a depth of several inches. The nest was a rather deep, rounded cup, compact and well made. Inside it measured an inch and a half in depth, and two inches in width. The wall of the nest was approximately half an inch in thickness, and was composed entirely of fine dry grasses, except for a few black plant fibers resembling horse hairs, woven into the lining of the bottom. It was sunken in a mossy mound, the top of the nest being level with the top of the moss. Labrador tea and swamp laurel, low bog shrubs that formed a dense tangle throughout the little opening, overtopped the moss by a foot or more and offered ample protection for the otherwise open nest.

The eggs, four in number, were of a delicate pinkish white, marked with brownish dots and splotches, which varied in color from very pale tints through the darker shades of purplish brown, some of the larger ones being so dark as to appear almost black. The markings were much heavier on the large end, gradually diminishing in size and numbers toward the small end. In one case the whole of the smaller end was almost entirely white. In length the four eggs varied, measuring in inches .78, .81, .81, and .84 respectively. They were of uniform width, .56, giving an average size of .81 x .56 for the clutch. The size of the eggs discovered by Seton[2] was .75 x .56.

The identification of the bird was confirmed by Dr. Thos. S. Roberts, Director of the Museum of Natural History, University of Minnesota, and the nest, eggs, and mother bird have been deposited in the Museum.

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EGG WEIGHTS FROM EGG MEASUREMENTS.[1]

BY W. H. BERGTOLD.

THE length of avian incubation periods differs widely according to the species. This fact has always interested ornithologists, who rightly maintained that there must be a definite and deep seated reason for such differences in this all important biologic process.

One explanation put forth for these various incubation periods was that they were associated with differences in egg size, a small egg requiring only a short period and vice versa.

In a previous publication[2] the writer considered this explanation in detail. After careful study it was felt that by "egg size" really was meant egg weight because it seemed highly improbable that the vitally important process of a bird's development could be closely correlated with the known infinitude of different egg measurements, when there was no similar variety of incubation lengths.

There are available in literature, so far as the writer has been able to learn, data relating to the weights of only about sixty bird species. Sixty recorded egg weights out of approximately twenty thousand known bird species, are, manifestly, wholly inadequate to throw much light on a possible relation between the incubation length and the egg size. Conceivably this great dearth of data relating to the weight of avian eggs might be negated by devising a way of getting an egg's original weight from its empty shell, which, if successful, would give initial weights of the thousands of eggs now contained in the world's egg collections. It is probable that the eggs of ten thousand bird species are in these collections. If it were possible to ascertain the original weights of all these eggs from the empty shells one conceivably could gather a mass of data amply sufficient to settle the question as to whether or not a relation exists between an egg's weight and the time it takes to incubate it.

[1] The writer is greatly indebted to Prof. M. G. Gaba and to Prof. J. E. LeRossignol of the University of Nebraska for aid in the mathematics of this problem; to Mrs. Anna Benson of Fruita, Colorado, to Mrs. J. L. Weldon of Loveland, Colorado and to R. J. Niedrach of Denver for material used in this study; to Prof. E. A. Stephens of the State College Station, Fargo, North Dakota and to Chas. N. Keen of the Colorado Agriculture College for information in re the specific gravity of hen eggs, and to Dr. Ira C. Brownlie of Denver for making skiagraphs.

[2] Incubation Period of Birds, Denver, 1917.

It is the object of this study to devise a way, if possible, to calculate the weight of a fresh egg from its empty shell.

Starting with the empty shell there are several ways of attacking the problem, two of which have been studied and tested by the writer.

The first is to determine the egg capacity by filling it with some liquid of known specific gravity. Distilled water would be the easiest, but it softens the egg membrane and in so doing diminishes the egg capacity.

Two other liquids were considered in connection with this method, viz., mercury (sp. gr. 13.6) and chloroform (sp. gr. 1.5), neither having any action on the shell, its membrane, or its pigment. When the egg's capacity for any particular liquid is learned it can be translated into distilled water capacity, and by multiplying this by the specific gravity of an egg, its approximate weight becomes known after adding the shell weight.

The risk of breaking a valuable egg by the weight of a mercury filling was considered too great to justify its use, hence this liquid was not tried out. It was, however, found to be quite otherwise with chloroform, for with it no objectionable effects were anticipated, or developed. The equation used in this method is as follows: $\frac{W - S}{A} \times B + S = X$, where W = weight of egg filled with chloroform, S = weight of empty shell, A = specific gravity of chloroform (1.5 +), B = assumed specific gravity of egg, X = original weight of the egg. This method gives results which probably do not exceed a plus error of more than 5%. If one were to employ it extensively there would be no mechanical difficulty in devising and constructing an apparatus to fill and evacuate an egg rapidly.

Results from chloroform method.*

Species	Size		Weight shell	Weight shell and chloroform	Weight of egg	Estimated weight
	L	B				
Killdeer	37.50	27.00	0.85	19.22	13.10	13.63
Robin	28.50	22.00	0.38	10.37	7.31	7.33

The second method was studied to determine whether or not the original weight of an egg could be deduced from its measurements.

* All weights and measurements are in grams and millimeters.

The first step taken in this phase of the present investigation was to consult trained mathematicians on the mathematics of an egg-shaped body. They produced an equation, which, using the length and breadth of an egg only, gives the cubic volume of an egg, from which, it was anticipated, there would be no trouble to arrive at the original weight of the egg. But it proved, in practice, to be quite otherwise. It proved otherwise because very little seems to be known about the variability of the several egg characters except the measurements. Such variability strongly influences the egg weight, whence it is patent that one should know as much about them as is possible in order successfully to devise a method to achieve the end desired and sought in this study.

There are but two previous publications known to the writer which give attempts to construct an equation wherewith one can ascertain the original weight of an egg from its measurements, both by Hoxie.[1] His final equation, as tested by the writer on fresh eggs gives a plus error varying from five to twenty percent. Moreover it does not seem well founded mathematically because it uses but one measurement, and especially because it ignores the breadth, which is the egg's most stable mensural character.[2] In the end the conclusion was reached that Hoxie's method gives too wide a range of error to warrant further trial and study.

Any equation for uses just outlined must give the cubic capacity of an egg less the space occupied by the shell and its membrane. The writer knows no way to estimate this deduction without destroying the egg as a specimen. Therefore it has been assumed in this study that the space taken up by the shell and its membrane is negligible.

If the cubic capacity be known, the original egg weight can be calculated from terms of distilled water, through the specific gravity of an egg. In introducing the specific gravity of an egg into the calculation one encounters a real difficulty because, so far as the writer has been able to learn, there are no data whatsoever, in ornithological literature, bearing on the specific gravity of eggs, and only a small amount in agricultural literature on that of hen eggs.[3]

[1] Ornithologist and Oologist, Dec. 1887, and Nov. 1890.

[2] Curtis, R. M., Maine Agric. Exp. Station, Univ. Maine Bull. 228, June, 1914.

[3] The specific gravity of hens' eggs is recorded as varying from 1.072 to 1.092: the writer determined it, on seventy-two eggs, as being (avg.) 1.075.

Therefore, at the very beginning of this investigation it became necessary to know something about the specific gravity of bird eggs, which was done to a limited extent by studying all the fresh eggs which the writer was able to secure through the efforts of his friends and himself.

The fresh eggs of all birds, wild and domestic, differ widely in weight according to the species, and even with eggs from the same bird individual. These variations are due to differences in the egg's length, breadth, white, yolk, shell, shell membrane and air space. It is very evident that the specific gravity of an egg is related to each and all of these characters.

It is well now to consider them in order to see how little is known about them. Variations in the length and breadth are too well known to need any discussion in the present paper, it being necessary only to say that such variations are paralleled closely by differences in the weight of the egg. However, this has not yet been demonstrated to any great extent, and would make a nice piece of original research. One thing relative to egg measurements is quite unknown to ornithologists, namely that with a hen's egg its breadth is the least variable mensural character, and has been found to be in high correlation with the weight of the egg. It remains to be determined whether or not this be true of the eggs of other birds.

The amount of shell varies according to the species, in Ducks (sp.) it is 14% of the egg weight, with Plover (sp.) 10%, and Hens 10%. In eighteen of our native birds the writer found that the shell and its dried membrane made from 3% to 15% of the total egg weight. When considering the shell it is necessary to recall that the smaller the egg the greater, relatively, is its shell area, and pari passu the greater relatively the amount of shell. It is possible that the thinner shell of a small egg is offset by the thicker shell of the larger egg. This has not as yet been determined.

By common consent it is assumed that the air space of an egg varies in size with different species and in different individual eggs, yet up to date it has not been demonstrated. Skiagraphs of fresh eggs of the domestic hen were made for the writer and showed clearly, and beyond all question, that the air space in all the eggs examined were far from uniform in size. It is desirable that data

on this point in relation to other bird eggs be accumulated, and made potentially useful for future students.

It was not possible through lack of time to make X-rays of all the eggs covered by Table No. 1.

With hen eggs the yolk, white and shell membrane, together, make about 64% of the total egg weight. The chemical composition of the first two of these constituents is subject to marked variation and, too, the water content fluctuates widely (5). It is obvious that alterations in such egg characters will be followed by changes in the specific gravity of the eggs, and that in the absence of definite knowledge of such fluctuations any equation designed to recover the original weight of the egg will fail to be rigidly correct in its results, when they are compared with the weight of the egg when first laid. In the face of these difficulties it was found expedient, as said before, to learn the specific gravities of the eggs of as many of our native birds as possible.

Besides the characters just mentioned which modify the specific gravity of an egg, two other conditions are powerfully active in altering it, viz., the age of an unincubated egg, and the time an egg may have been incubated. An unspoiled hen egg has its specific gravity lowered, thirty days after having been laid, from 1.090 to 1.035, that is about 61%. The diminution in an old unincubated egg is due, most likely, to loss of water which is followed by an increase in the air space. The lowering of the specific gravity in an incubated egg is, in all probability, caused by the development of the embryo through metabolic changes in the egg albumins.

In order to reach reasonably conclusive knowledge concerning all variations in the characters of an egg so that such knowledge might be used in constructing an equation exact for the end sought in this study, it would be necessary to destroy a large number of the eggs of our native birds, something the writer was loath to do. Therefore, all variations in egg characters were disregarded in this investigation, except those relating to measurements. In the face of the varying egg specific gravity found to obtain in our birds, by the writer, it became necessary to assume a specific gravity which could be considered as applicable to all eggs. This was taken as 1.043 which is the average found by the writer in the eggs of nineteen species of our native birds, a total of thirty-two eggs having

been studied. It will be seen on reference to Table No. 1 that the specific gravities of the eggs available varied between 1.020 and 1.065. It seems highly probable that the specific gravity of all bird eggs is well above 1.050, those ranging below that level being low because not fresh or having been subjected to more or less incubation. This is substantiated, in part at least, by the fact that when some of the eggs studied were blown they showed definite indications of developing embryos. The higher specific gravity of the eggs of our domestic hen also points to a higher specific gravity than that taken for use in the equation developed in this investigation.

The equation finally used in this study and chosen as best meeting the aim of the present bit of research is as follows:

$$\frac{11}{21} \times (L \times B^2) \times S = W,$$

where L = length, B = breadth, S = specific gravity, and W = calculated weight. If the measurements be in metric W is the weight in milligrams. If the measurements are in inches or fractions thereof, the equation becomes

$$\frac{11}{21} \times (L \times B^2) \times \frac{252.5}{437.5} \times S = W \text{ (in oz. avdp.).}$$

The differences between the actual weight and the calculated weight as brought out by this equation did not exceed, in practically all of the eggs tested, more than 5%, an error probably due to the eggs having been more or less incubated, or not fresh.

This equation, as tested on data gleaned from general literature[1] gives the following answer: a guinea hen's egg is said to weigh 1.40 oz., its length is given as 1.88 inches and its breadth as 1.50 inches. The calculated weight worked out from these data emerges as 1.34 oz.

The results obtained from data gathered on recently collected eggs are exemplified in Table No. 1.

[1] New International Encyclop. Vol. VI, p. 681.

TABLE No. 1.*

Species	Size		Weight			Sp. Gr
	L	B	Egg	Shell	Estimated	
Green-winged Teal	49.00	35.00	32.64	2.55	33.01	1.058
Blue-winged Teal	45.00	33.00	27.32	2.06	26.95	1.067
Coot	52.00	34.50	32.01	2.93	34.03	1.046
	44.00	33.50	25.51	2.45	27.15	1.046
Killdeer	37.50	27.00	13.01	0.87	15.03	xxxxx
Gambel's Quail	31.50	25.00	9.32	0.91	10.75	xxxxx
	33.50	25.00	10.52	0.95	11.51	xxxxx
Mourning Dove	28.50	21.00	6.26	xxxx	6.91	xxxxx
	27.00	19.50	5.26	xxxx	5.64	xxxxx
	27.50	20.50	5.96	0.27	6.33	1.040
	30.00	21.50	7.99	xxxx	7.62	1.052
	29.00	22.00	7.64	xxxx	7.71	1.041
	29.00	20.50	6.52	xxxx	7.70	1.040
Marsh Hawk	47.50	36.00	33.22	2.55	33.85	1.038
Flicker	28.00	21.50	6.92	0.55	7.11	1.063
Magpie	34.50	24.00	10.20	xxxx	10.92	1.041
	33.50	23.50	9.80	xxxx	10.17	1.032
	34.00	24.00	10.15	xxxxx	10.77	1.030
	33.00	23.50	9.35	xxxx	10.01	1.032
	34.00	24.00	10.75	xxxx	10.77	1.030
Cowbird	22.00	17.00	3.00	xxxx	3.49	1.021
	21.00	16.50	3.07	xxxxx	3.14	1.030
	21.50	17.50	3.11	xxxx	3.62	xxxxx
Yellow-headed Bl'kbird	26.50	18.50	4.87	0.26	4.98	1.052
	26.00	18.50	4.68	0.27	4.89	1.042
Red-winged Blackbird	28.00	17.50	4.56	0.22	4.71	1.022
	25.00	17.50	3.99	xxxx	4.20	1.053
Meadowlark	27.50	21.00	5.77	0.39	6.67	xxxxx
Vesper Sparrow	19.50	15.00	2.26	0.17	2.41	xxxxx
	20.00	16.50	2.99	xxxx	2.99	1.064
Lark Sparrow	21.00	15.50	2.77	0.23	2.77	1.026
	21.00	15.50	2.58	0.19	2.77	1.024
Lazuli Bunting	20.00	14.00	2.15	0.12	2.15	1.039
English Sparrow	21.50	15.00	2.27	0.24	2.66	xxxxx
Barn Swallow	20.00	14.50	2.20	0.33	2.31	1.048
Yellow Warbler	17.00	12.50	1.42	xxxx	1.45	1.036
Long-tailed Chat	22.50	17.00	3.43	0.23	3.57	1.059
Catbird	24.00	18.00	4.07	0.27	4.27	1.063
House Wren	17.00	13.00	1.47	0.11	1.58	1.065
Robin	28.50	22.00	7.31	0.38	7.58	1.027
	25.50	18.50	4.66	xxxx	4.74	1.024

* All measurements and weights are in millimeters and grams; decimals of estimated weights are approximate only.

The plus errors in the calculated weights are probably due to the air space unavoidably being calculated as egg content.

Many egg weights recorded in literature are probably grossly below the true original weight because the eggs were either not fresh or had been more or less incubated.

SUMMARY.

The original weight of an egg can be determined, within a maximum error of 5% by the equation devised and used in this investigation. Hence the weights of a huge number of eggs are now potentially available for study. This number of potentially available egg weights is amply sufficient to decide if there be, in truth, any relation between the egg's weight, and its incubation period.

To work this out would make a valuable bit of original research for someone with time and inclination to do it.

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NOMENCLATURE AND SYSTEMATIC POSITION OF THE PARADISE WHYDAHS.

BY JAMES P. CHAPIN.

WHILE my paper on the Paradise Whydahs[1] was still in press, Mr. H. Grote published his description of *Steganura paradisea interjecta*,[2] so that this name antedates my own *longicauda* for the race inhabiting the grasslands from the Lado Enclave west to the Cameroon. The following year the same author showed that there is an additional race, with still longer rectrices, in the savannas adjacent to the Upper Guinea forest; and this he named *togoensis*.[3] In the shape of their lengthened rectrices these two forms show a resemblance to the race from Senegal and the western Sudan, to which Professor Neumann gave the name *aucupum*.[4] So also do the races which I proposed to call *nilotica* and *obtusa*, from the eastern Sudan, and from the grass-countries between Angola and Nyasaland, respectively. On the other hand, from Eritrea south to Natal and west to southern Angola we find a form with long tapering tail-feathers, which I am convinced is the one named *paradisaea* by Linnaeus. At present six kinds of Paradise Whydah are generally recognized, instead of two as in 1921.

I. NOMENCLATURE.

Recently the study of the genus *Steganura* has been taken up again by Mr. R. Neunzig,[5] who introduces the subject by stating that his results differ markedly from mine. No new races are separated, however, and the only difference of importance in his first paper is one of names. That he considers them all as races of a single species is in full accord with the usage of ornithologists in Germany at present, or in other words, with the Formenkreis theory. Like many other American students, I prefer to recognize

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[1] Chapin, 1922, American Museum Novitates, No. 43, pp. 1–12.

[2] 1922, Journ. f. Orn., LXX, p. 402 (Between Nola and Mbaiki, W. of Ubangi River).

[3] H. Grote, 1923, Orn. Monatsberichte, XXXI, p. 43 (Kete, Togo).

[4] 1908, Bull. Brit. Orn. Club, XXI, p. 43 (Diourbel, Senegal).

[5] 1928, Zool. Anzeiger, LXXVIII, pp. 177–190; 1929 Journ. f. Orn., LXXVII, pp. 1-21.

any well-marked gap in superficial characters by employing different specific names; and thus I have regarded *paradisaea* and *aucupum* as distinct species. We do not mean thus to deny them close blood-relationship or common ancestry, as might a true follower of Pastor Kleinschmidt, if he were to employ the same nomenclature. That the two groups of *Steganura* do overlap in some regions where their ranges meet cannot be denied, and males of the two groups *in nuptial dress* have been taken at the same locality and date. To explain the reasons will require more careful field observations. Breeding experiments would be difficult, because *Steganura* and its nearest allies are believed to be parasitic in their egg-laying, and we cannot yet distinguish the females of the various forms. Pending more thorough investigation, one point of view is about as logical as the other.

Intergradation between males of the two groups in the form of their longest pair of rectrices is unknown. If they do interbreed, there is complete dominance, or, as Neunzig calls it, alternative inheritance. With no knowledge of the genetics of the case, however, we may as well use nomenclature to point out the visible characters of the birds. Neither can migration be appealed to. So far as my own observations go, if the Paradise Whydahs do migrate, they cannot travel far, for the ranges of the various races of *aucupum* are too well defined; and males of *paradisaea* have been taken in breeding dress from Northeast to South Africa.

To take up the question of subspecific names: Neunzig has examined Heuglin's types of *orientalis*[1] in the Stuttgart Museum, and finds that they are not birds with tapering rectrices, but belong instead to the form which I named *nilotica*. This must be accepted, although from Heuglin's own diagnosis and the fact that in his synonymy of *orientalis* he included the names *australis* Heuglin, *verreauxi* Cassin, and *sphaenura* Bonaparte, there could be no way of determining it without reëxamining the types. The form of the lengthened rectrices evidently meant nothing to Heuglin.

The most important taxonomic question discussed by Neunzig is the application of Linnaeus' name *paradisaea*. Here we still disagree radically. Neunzig attempts to shift this old name to the race with the shortest and broadest rectrices, which I have named

[1] Heuglin, 1871, 'Orn. Nordost-Afrikas,' I, p. 583 (Northeast Africa).

FIGURE 1. THREE OF THE FORMS OF PARADISE WHYDAH.

A. Copy of Aldrovandus' figure of *Passer Indicus Macrourus alius*, probably equivalent to *Steganura a. aucupum* Neumann. B. Copy of Edwards' figure of The Red-breasted Long-tailed Finch, or *Steganura paradisaea* (Linnaeus), from Angola. C. Male of *Steganura aucupum obtusa* Chapin, with rectrices fully grown, from the highland of northwestern Benguella—one-fourth natural size. A and B are reduced in size so that the wing-length is approximately equal to that of C.

Steganura aucupum obtusa. Neither Linnaeus nor any of his predecessors ever described a bird of this form, and it is almost equally certain that they never saw one.

Before writing my paper of 1922 I had consulted all the references given in the 10th and 12th editions of Linnaeus' 'Systema Naturae.' As I stated, Aldrovandus' figure represents one of the forms with band-shaped rectrices, rather long, which probably came from Upper Guinea, inasmuch as the description includes: "Collum & pectus coloris sunt coccinei." But no locality was given. This figure cannot possibly be construed as the short-tailed Angola race, a comparison with a specimen or a figure of *obtusa* is convincing (Fig. 1). Neither of course can it be confused with the southern and eastern form with tapering rectrices.

Willughby copied his description from Aldrovandus, but the figure cited by Linnaeus from Willughby's work is a reversed copy of Aldrovandus' cut of the bird we now call *Vidua macroura* (Pallas). Petiver also copied the picture of *Vidua macroura* from Aldrovandus. Edwards, on the other hand, described and figured a male which he kept alive in captivity, of the form with long tapering rectrices, which Neunzig would now have us call *sphaenura* of Bonaparte. The fact that the nape is shown much too rufous is of little moment. Edwards stated that the bird came from Angola, and this is the only locality mentioned in the four references cited by Linnaeus in his 10th edition.

Emberiza paradisaea Linnaeus, 1758,[1] is thus a composite species, based on plates and descriptions of a bird similar to that of Senegal and another such as is found from southern Angola to Natal and Eritrea. The figures of *Vidua macroura* may be disregarded, as Linnaeus' description reads "*Nigra est sed* cervice & pectore *coccineo.*" But the description does not bar Edwards' plate, for this also shows considerable reddish on the hind-neck, albeit erroneously. If we could select the first reference cited, we might be inclined to fix the type-locality as Senegal; but if we take the only locality mentioned in the references, it will be Angola. Linnaeus simply said "*Habitat in* Africa." The bird described by Edwards from Angola is clearly that with long, tapering rectrices; not the one with short, exceedingly broad rectrices which also occurs in Angola.

[1] 'Systema Naturae,' 10th Ed., p. 178.

Neither could Aldrovandus' bird have come from Angola, because of the shape of its rectrices.

As a matter of fact, Linnaeus in his 12th edition (1766), p. 312, did designate the type-locality as "*Habitat in* Africae *regno Angolensi.*" These words were quoted verbatim from Brisson,[1] whose description and figure he now added to his references. Brisson's specimen was in the cabinet of M. de Reaumur, and belonged clearly to the same race as Edwards' bird. Who can doubt that Linnaeus was naming the bird with long tapering tail-feathers, which he was reliably informed came from Angola? If any further argument be needed, it is there in Linnaeus' own words in the 12th edition: "Rectrices 4 *intermediae corpore longiores falcatae; 6, 6 corpore longiores in filum desinentes; 5, 5 quater longiores quam intimae 6, & subensiformes, ex harum sinu baseos seta longa dependet.*" In Neunzig's paper (1928, p. 179) this part of the description is quoted, but with three typographical errors. Inasmuch as Linnaeus expressly stated that the longest pair of rectrices is *four times* as long as the innermost pair, the description cannot possibly be made to apply to *obtusa*, where they are but 2 to 2½ times longer. In the plates of Edwards and Brisson this proportion is about 3½ to 1, if we except the hair-like tips.

Before 1766 there was no published figure or description of a Short-tailed Paradise Whydah from Angola. It is useless to argue, as Neunzig does, that Aldrovandus' figure may represent a specimen from Angola. The copy here offered will make this clear. Aldrovandus described a bird of Upper Guinea, his mention of a reddish neck excluding even that of the northeastern Sudan. And Linnaeus himself expanded his descriptions so that it applies only to the bird with long tapering tail-feathers. Jules Verreaux was perhaps the next ornithologist to see the real significance of the shape of these rectrices, but Cassin and Bonaparte were not justified in taking his advice and renaming the bird with tapering tail. It had already been named by Linnaeus, and the birds from southern Angola and Abyssinia are identical.

Neunzig argues further that birds such as Edwards and Brisson figured are not found in Angola proper. Yet the British Museum has a male in breeding plumage labeled as collected at Loanda by

[1] 1760, 'Ornithologie,' pp. 120–124, Pl. VIII, fig. 1.

Toulson. This is very probably the one reported as *Vidua paradisea* by Bocage,[1] and I see no reason to question the data. Many species of birds of the dry region near Mossamedes extend much farther north along the arid coast of Angola than they do in the better-watered interior. Bocage himself described the males among Angola specimens as having the lateral pair of lengthened rectrices much longer than the median pair, and narrowing more and more towards their extremity, giving their length as 335 mm. The maximum tail-length in *obtusa* is only 216 mm.

While accepting Angola as the type locality of *paradisaea*, Neunzig insists upon the Kingdom of Angola as then recognized. But in the second half of the eighteenth century, when Brisson wrote, the name Angola was already being applied to a much larger area. Thus, in the 'Encyclopaedia; or, a Dictionary of Arts, Sciences, and Miscellaneous Litterature', Volume II, published in Philadelphia by Thomas Dobson, 1798, we are informed on p. 7:

"ANGOLA, a kingdom on the western coast of Africa, lying according to the most probably accounts, between Lat. 8.30 and 16.21 South, forming a coast of upwards of 480 miles. Angola Proper is bounded on the north by the River Danda, which separates it from Congo; and on the south by the Coanza, by which it is separated from Benguela. This last, however, is now included in the kingdom of Angola, having been conquered by its monarchs, tho' it still retains the name of kingdom, and is included in the dimensions we have just now given."

We know today, of course, that the interior of Angola is inhabited by the shorter-tailed *obtusa*, with exceptionally broad rectrices. But we also have every reason to believe that no specimen of *obtusa* was known in Linnaeus' time. Certainly none had been figured. I have examined the material in eight of the museums of Europe and the United States, and Neunzig has done the same in seven other museums of Europe, with the result that the earliest specimens of *obtusa* extant appear to be those of Mechow, Schütt, and Böhm. None of these was collected before 1878!

Such questions of nomenclature are merely the book-keeping of ornithology. But it would be most regrettable if we allowed the entries to be altered without reason. I have gone into this matter

[1] 1881, 'Ornithologie d'Angola,' p. 346.

at considerable length, in the hope that further confusion in the names of the Paradise Whydahs may be avoided. It is evident that Cassin and Bonaparte were wrong in regarding the Senegal form as Linnaeus' *paradisaea*. Professor Neumann discovered their mistake, and named the Senegal bird *aucupum*. Having adopted this necessary change, we ought to beware of further errors such as that into which Neunzig would lead us. *Steganura paradisaea* (Linnaeus) is most certainly the bird figured by Edwards and Brisson, which is found in southern Angola, if not indeed along the coast northward to Loanda. Briefly, let us repeat the reasons:

(1) Linnaeus himself restricted the type-locality of *paradisaea* to Angola.

(2) Of the two forms of *Steganura* now known from Angola, only the one with long, tapering rectrices agrees with Linnaeus' description of 1766.

(3) Linnaeus gave references to two good drawings of birds said to have come from Angola, both with tapering rectrices.

(4) The other, broad-tailed form from Angola (*obtusa*) had neither been described nor figured when Linnaeus wrote, and seems not to have been collected before 1878.

II. The Systematic Position of Steganura.

In the second paper, which deals with the parasitic reproduction of *Vidua* and its allies, Neunzig[1] touches briefly on the classification of the Ploceidae, and states his preference for the arrangement followed by Shelley (1905), in opposition to that which I proposed in 1917.[2] Like most of the earlier classifications, Shelley's was based on the relative size of the outermost primary and the presence or absence of elongated rectrices. The slight value of these characters I have already discussed, and my conclusions as to the relation between the *Vidua* group and the Estrildinae have since been examined critically by Professor Sushkin,[3] after careful anatomical comparisons. This recent work must have been overlooked by Neunzig.

Since Professor Sushkin's findings differ slightly from my earlier conclusions, the latter having been based largely on external fea-

[1] 1929, Journ. f. Orn., LXXVII, pp. 1–21.
[2] Bull. Amer. Mus. Nat. Hist., XXXVII, pp. 243–280.
[3] 1927, Bull. Amer. Mus. Nat. Hist., LVII, pp. 1–32.

tures, we may quote a few sentences from his paper (pp. 24, 25): "*Pyromelana* and (from the structure of its horny palate) *Coliuspasser* prove to belong to the Ploceinae, where these genera have been placed by Chapin, contrary to the opinion of other classifiers of the group . . . *Vidua* and *Steganura*, while showing unmistakable features of the Estrildinae, differ less strongly than usual from the Ploceinae . . . *Vidua* and *Steganura*, which show some unmistakable features of the Estrildinae, and none of the characters common to the Ploceinae that could not be interpreted as primitive, are in their skeletons the most primitive of Estrildinae . . . they are strongly modified in their nuptial plumage, but on a very low base."

While aiding Professor Sushkin in his studies, I found that he was inclined to subdivide the Estrildinae in several groups, such as a *Munia-Spermestes* group, a *Vidua* group, and possibly one for *Pyrenestes*. Of course he never considered *Pyromelana* or *Coliuspasser* as members of the "Viduinae." Several divisions of this sort within the Estrildinae had already been indicated by horizontal lines in my classification of 1917 (p. 261). To call them subfamilies might seem to create an excessive number for the single family Ploceidae.

I have, to be sure, pointed out the differences in mouth-markings between the young of the *Munia-Spermestes* group and of the majority of other Waxbills,[1] but Neunzig's further studies[2] have revealed intermediate patterns, especially in *Steganopleura* and *Poëphila*.

I still have no doubt that in internal characters *Steganura*, *Tetraenura*, *Linura*, *Vidua*, and *Hypochera* are much closer to *Estrilda* than to *Coliuspasser*, *Pyromelana*, and allied genera. The *Vidua* group (in a restricted sense) may nevertheless come to be regarded as a valid subfamily not far removed from the Estrildinae. Some of its distinctive characters I have already shown, especially the peculiar condition of the skull-roof, which remains throughout life in a state like that of most immature Passeres. Professor Sushkin

[1] The name Spermestinae was abandoned in favor of Estrildinæ because *Estrilda* Swainson 1827 antedated *Spermestes* Swainson 1837.

[2] Neunzig, 1929, Beiträge zur Fortpflanzungsbiologie der Vögel, V, pp. 7–17, Pls. I, II.

remarked upon the pneumatic perforations of the inner head of the quadrate.

In the wing-pterylosis Mr. W. De W. Miller has discovered an unexpected peculiarity of the *Vidua* group, and another of the typical Estrildinae, which I shall here report with his kind authorization:

(1) The vast majority of Oscines have no true lesser upper secondary-coverts, or only vestigial downy feathers representing them. In the latter condition they are completely hidden beneath the marginal coverts. Among Clamatores there is usually one row of well-formed lesser coverts.

Nevertheless, there are exceptional cases among the Oscines. *Corvus* and *Gymnostinops* do have 5 to 8 of the proximal lesser secondary-coverts large enough to be visible, but the distal ones are often lacking. *Ptilonorhynchus violaceus* has 8, of which 4 or 5 proximal feathers are normal and visible. While *Paradisaea apoda* has a single row of lesser coverts, not large enough to be visible beyond the marginals, *Paradisaea rubra* is altogether exceptional in having two visible rows of lesser coverts.

The *Vidua* group differs from the remainder of the Estrildinae, as it does also from all Ploceinae, in possessing one row of well-developed lesser secondary-coverts. Thus *Vidua macroura* has a normal row which is well-formed and visible; *Steganura paradisaea* and *Linura fischeri* have 5 good-sized lesser coverts, the distal 2 or 3 being absent; and *Hypochera ultramarina* shows a similiar row of 6 feathers.

This might be regarded as a primitive character; but it is not found in *Bubalornis* and *Dinemellia*, where there are only concealed downy vestiges of the feathers. These last two genera were regarded by Professor Sushkin as the most primitive members of the whole family.

(2) In most Oscines the first (or innermost) lower greater primary-covert is present and of nearly the same size as the second member of the same series. In the Ploceidae it is variable. Thus it is normal in *Xanthophilus galbula*, but of distinctly reduced size in *Textor cucullatus*. Sometimes reduced in *Pyromelana*, it is nearly normal in *Coliuspasser*, but conspicuously enlarged in *Diatropura*. *Bubalornis* and *Dinemellia*, though evidently primitive, exhibit a decided reduction of this innermost lower primary-covert.

The complete absence of the feather is a surprising feature of most Estrildinae, as for example *Munia, Padda, Aidemosyne, Spermestes* (except probably *S. nana*), *Amadina, Taeniopygia, Ortygospiza, Stizoptera, Lagonosticta, Amandava amandava, Neisna subflava, Estrilda, Erythrura prasina,* and *Uraeginthus.* In *Poëphila gouldiae,* on the other hand, the covert in question is present but reduced in size, and the reduction has gone farther in *P. acuticauda.*

The *Vidua* group has retained the innermost greater primary-covert of the under wing-surface, which shows only slight reduction in *Vidua, Steganura,* and *Linura,* but more considerable decrease in *Hypochera.* The presence ot the feather furnishes another distinction between the *Vidua* group and most Estrildinae (except *Poëphila*). It might be argued that it is a point of resemblance to many Ploceinae, but as such it is outweighed by many other points of difference.

* * * * *

Neunzig concedes that his union of *Pyromelana* and *Coliuspasser* with *Vidua, Steganura,* and their allies in a subfamily Viduinae rests on but two characters: (a) the prenuptial molt with elongation of some or all of the rectrices in the male breeding plumage; and (b) the streaked, bunting-like pattern of the other plumages. Such purely superficial characters can bear but little weight in establishing subfamilies. *Amandava* among the Estrildinae likewise has a prenuptial molt and brighter breeding dress. Moreover, some species of *Sitagra* and *Othyphantes* have a prenuptial molt, while others of the same genus do not. *Hypochera* never has any long rectrices; and the lengthening of only four median rectrices in *Steganura, Vidua* and their close relatives is a very different matter from the prolongation of the whole tail in *Coliuspasser, Drepanoplectes,* and *Diatropura.* That the prenuptial molt of the tail is anything but a fundamental character must be clear from the failure of *Pyromelana hordacea* to shed its rectrices at the prenuptial molt, whereas they are renewed without noticeable lengthening in *Pyromelana xanthomelaena.* As for the streaked color-pattern in the duller plumages, subfamilies demand better characters than that.

The gape-wattles and palatal markings of the young of the *Vidua* group are much more typically Estrildine than those of *Spermestes,*

Munia, or *Padda*. And the eggs of the *Vidua* group are white like those of the Estrildinae. To attempt to ally the *Vidua* group with *Coliuspasser* rather than with *Estrilda*, and then to argue that the spotless white eggs and mouth-markings in the young have been acquired afresh through a process of parasitic mimicry of their fosterers, this is indeed putting the cart before the horse.

The very remarkable resemblances pointed out by Neunzig between the young of certain species of parasitic "Viduinae" and of the Waxbills by which their young are believed to be reared may be cited in direct contradiction to his views on classification. Though I cannot confirm all the juvenile resemblances between the parasites and their supposed hosts, I have examined the mouths of young of *Steganura paradisaea*, *Vidua macroura*, *Vidua hypocherina*, and *Hypochera camerunensis*, and have found them similar in the main to the sketches given by Neunzig. Yet the differences between the various species and genera of parasitic "Viduinae" are about what one finds between allied species and genera among the typical Estrildinae. Even if selective mimicry could be proved, would it not be wiser to admit that the process began with forms whose young already were provided with gape-wattles and palatal markings similar to those of the Estrildinae?

The conclusion seems inevitable: that while *Steganura*, *Tetraenura*, *Linura*, *Vidua*, and *Hypochera* may perhaps be regarded as a distinct subfamily, they are closely allied to the Estrildinae, such as *Pytilia*, *Lagonosticta*, *Estrilda*, and *Granatina*. Nor can the *Vidua* group be placed in the same subfamily as *Pyromelana*, *Coliuspasser*, *Drepanoplectes*, and *Diatropura*, all of which are clearly Ploceine.

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ON THE USE OF A REFRACTING ALTAZIMUTH TELESCOPE FOR BIRD OBSERVATION.

BY DR. LEON AUGUSTUS HAUSMAN.

Plate XXVII.

During the spring of 1926 the writer, in experimenting with the terrestrial ocular of a three and one-half inch altazimuth refracting telescope, directed the tube of the instrument toward the top of a tall Shagbark Hickory about sixty rods away across an open field, in order to test the sharpness of focus of the lenses, as well as to determine whether the ocular would resolve clearly a flock of *Icteridae* with which the topmost boughs of the tree were laden. What was his gratification to see that not only could the birds be sharply focused, but their motions in detail watched, and diagnostic characters of different species unquestionably made out. Redwings, Rusties, and Grackles could be clearly seen and indubitably identified. The telescope was then moved nearer—about thirty rods from the tree—and set up in concealment behind a row of bushes bordering a wood and behind a rail fence, and from this point a complete specific census of the flock was made. Observations of the same kind were made, of other flocks of birds during the next few weeks, and it was soon apparent that this method of observation had several very real advantages. In the first place the clear images of the birds and their relatively large size in the field of the telescope made specific identifications easy and certain, even at a distance. In the second place, it was possible to watch a flock for long periods of time, almost uninterruptedly, without fatigue, and in a comfortable sitting posture. At first a box was used as a seat but later a folding camp stool, with a cloth seat and a back was found much more comfortable. In the third place, the hands were left entirely free for note-taking and sketching, for when the focus of the instrument was once adjusted for a particular tree-top it did not need further attention. And in the last place, it was possible to make observations at some distance away from the birds under scrutiny—at a greater distance than could be ocularly over-leapt by even eight-power binoculars, and to remain concealed and quiet, the while.

These first, somewhat casual observations, led, later in the same season, and again during recurring years, to a series of more systematic ones with the view of determining whether a telescope of the type used might not be employed with advantage in the close scrutiny of birds at greater distances than binoculars would be able to bridge successfully. Accordingly several pairs of optically good prism binoculars were secured and their relative usefulness in the field compared with that of the telescope. The binoculars used were:—(1) an eight-power, 27 mm. objective, (2) an eight-power, 30 mm. objective, (3) a ten-power, 27 mm. objective, (4) a sixteen-power, 40 mm. objective—this was the "Telsexor" by Zeiss, a superb glass! and (5) a twenty-power, 45 mm. objective. The telescope was a three and one-half inch refractor, by Bardou and Son, Paris, rack and pinion focus, with finder-telescope mounted on the main tube, altazimuth mounting on heavy oak tripod with double legs, fitted with adjustable central pillar and a device (added later) for the direct reading of the inclination of the telescope tube from the horizontal, in degrees. Three terrestrial oculars were used, giving magnifications of thirty, forty, and fifty diameters. The thirty and fifty times oculars were assembled by the writer from Leitz compound microscope eyepieces, and the forty times ocular was furnished with the telescope.

It was found almost at once that the fifty times ocular was not satisfactory for this sort of terrestrial work; the image formed was too tremulous, to allow it to be carefully examined, and the high magnification demanded the sacrifice of too much light. The forty times ocular proved very useful in good light, and the thirty times was useful in all the conditions under which the telescope could be employed at all.

One of the earliest uses made of this telescope was in studying the nest-building activities of a pair of Red Shouldered Hawks (*Buteo lineatus lineatus*).[1] The instrument was concealed in a patch of bushy woodland (Pl. XXVII) about a fifth of a mile from another wooded area from the center of which arose a tall White Oak in which the hawks had commenced operations about forty feet from the ground. In the field of the telescope the pair of birds could be

[1] Hausman, L. A., The Hawks of New Jersey, Bull. 439, N. J. Ex. Station Rutgers University, New Brunswick, N. J., 1927, p. 48.

WATCHING THE NESTING OF A PAIR OF RED-SHOULDERED HAWKS THROUGH A THREE-AND-ONE-HALF INCH REFRACTOR.

closely watched as they brought their collection of sticks, weeds, bark, leaves, and the like, and their activities in the fabrication of these heterogeneous materials into a firmly aggregated nest, studied. Unfortunately the birds deserted the nest before the eggs were laid (perhaps before the completion of the structure). It is thought that one of the pair was killed. The advantages in thus studying these birds through the telescope were that they were seemingly unconstrained and natural in their actions, apparently unaware that they were the objects of close scrutiny; and that long-continued watching was possible without fatigue to the observer. Note taking and sketching at the eyepiece were easy and pleasant, since the arms were free and not tired out holding up a pair of glasses to the eyes. The image in the telescopic field was free from vibration, for the telescope, as has been said, was buried in a wooded glade, within which even moderate winds did not make much of a stir.

Later in the year the telescope was taken to an undulating marsh and meadow territory, and Marsh Hawks (*Circus hudsonius*) watched in flight, and found not at all difficult to follow after practice, first with the thirty-times, and then with the forty-times ocular. The wide field of view of the telescope, and the ease with which the tube could be swung vertically and horizontally, and focussed, made it possible—not to say simple—even during periods of unusually erratic flight, to keep the bird in the center of the ocular field, provided it was at least 500 feet or more away. The farther away the bird was, the less its apparent motion, and the simpler the problem of keeping it always centered and in focus. Slight movements of the head could be observed as the bird inspected the ground over which it flew, and motions of the tail and legs which the writer had never seen before through binoculars were apparent and interesting as indicating the complexity of the muscular adaptations which were continuously going on during flight. During the observation of one individual it was seen to turn the head toward the tail, close the eye, and then to scratch the region just below it vigorously with one foot, dangling the other one meanwhile to the full extent of the leg. This observation was made through the forty-times ocular when the bird was at least a quarter of a mile away, and about 300 or 400 feet in the air. The eight-

times binoculars could not give such an intimate view of this bird as did the telescope, and the sixteen-times and twenty-times were too unsteady for use.

In following bird flights—at a distance always—the tube of the telescope could be swept along steadily and evenly and depressed and elevated smoothly on its well-oiled bearings with the left hand, while the fingers of the right hand manipulated the screw of the rack and pinion focal adjustment. After practice this was found to be no more difficult than to follow a swimming protozoan under the compound microscope, the left hand moving the slide (or the mechanical stage screws) and the right hand altering the fine adjustment of the focus. After some slight dexterity in this matter had been acquired it was not difficult to keep a flying bird such as a hawk, a vulture, or a crow, in the center of the field of view with a steadiness of image sufficient to enable accurate observations to be made of the movements of head, tail, legs, and wings, or to determine, in some cases, what the bird was carrying. Thus in one instance the writer followed a Turkey Vulture (*Cathartes aura septentrionalis*) as it arose from a woodlot nearly a half a mile away, until it was lost in the distance, and could clearly make out a snake of some small species, either grasped (!) in the bird's weak talons, or tangled about the leg. The telescope showed, moreover, motions of the snake which seemed to be of its own making—upward writhings, and the like—which first led the observer to postulate it *as* a snake, and to conclude that it was still alive.

For the identification of hawks at great distances—too great for the use of binoculars—the telescope proved most useful. Thus at different times it was possible to identify the Red-Tailed Hawk (*Buteo borealis borealis*), the Marsh Hawk, and Red Shouldered species already referred to, when the birds were too far off and too high to be resolved beyond doubt by binoculars. In these instances the eight and ten powers did not magnify sufficiently, and the sixteen and twenty powers were too unsteady. Even when rested upon a support it was found that the sixteen powers did not enlarge the image enough for an undoubted identification, and the twenty powers admitted too little light. In this connection of the observation of hawks at considerable altitudes, it was new to the writer that the Marsh Hawk so often resorts to elevated soarings,

at almost any time of the year. Again and again the telescopic image of a hawk so high in the air as to be a mere bifurcated outline, even in the ten-times binoculars, showed the diagnostic white rump-patch, or revealed the characteristic contour of the wings and tail of the species. In some instances these field marks could not be made out at all with the eight-times binoculars, and with nothing like certainty through the sixteen-times. The twenty-times were always uncertain in attempted identifications of this long-range sort because of the tremulous character of the image.

The diameter of the field of view of the telescope, with the forty-times ocular, at a distance of twelve inches from the eye, was six and a half inches. It was estimated that a flying Marsh Hawk at a distance of one-half mile, and 400 to 500 feet in the air, was seen in this field about two inches in length. With a sharply focussed image, and with the bird in good light it will be apparent that diagnostic color and contour characters could not be difficult to note.

During the observation of a Red-tailed Hawk, sailing at a height of 800 to 1,000 feet it was noted that the head was moved constantly from side to side, and up and down, and obliquely inclined, as if the bird were carefully scrutinizing the terrain below. Other Red Tails have been observed, at different altitudes, to show the same head motion. The opening, and partial closing of the tail has been watched, and the delicate adjustments of tail and wings just preceding changes in the direction of flight. It is believed that studies made through the telescope of flying hawks will result in the accumulation of much data on the flight habits of these birds which we may not now possess. Some interesting, and it is thought, new observations on the flight habits of the Turkey Vulture have been made through the telescope described, and these may be presented in these pages in the near future.

The ideal location for the use of the telescope in this sort of bird study was an open hilltop, about two hundred feet above a wide-open stream valley, flanked with various types of country round about, such as; open fields, scrubby meadow-lands, marshy sloughs, patches of woodland, a high hillside covered with a dense forest of hardwoods, a farm with adjoining cultivated fields, several fence-rows with their characteristic linear conmunities of bushes and vines, and several tall dead chestnut trees in the distance. In this

setting the binoculars could be used for birds close at hand, and the telescope for those more remote. Incidentally the telescope proved invaluable in the examination of the antics of a woodchuck on a far hillside nearly a mile away, who seemed to be in some difficulty respecting the renovation of the architecture of his doorway. Again the instrument afforded some respite from the more serious business of data-collecting when focussed on a farmer and a refractory colt which had gotten loose behind a barn in a little stream valley nearly two miles off in another direction. In this setting just described, and surrounded by territory of varying topography and plant associations, and inhabited by different groups of birds, the writer has spent many pleasant and profitable hours without once stirring away from the spot in which his telescope was planted. Here many notes were taken on the flight of hawks, and some observations of the Turkey Vulture made, which have been just referred to. A good deal of apparatus, it is true, had to be transported and set up, but the transportion was easily made by automobile, a roadway running to a point within a few hundred feet of the observation site. The telescope is a portable one, and fits into a box of convenient dimensions.

In the study of birds not in flight, at a distance, and undisturbed the telescope has proved of much service. Thus there have been watched among other things: the feeding of a flock of Turkey Vultures about a carcass, the courting antics of a pair of Flickers, the mutual preening of a pair of Crows (on one of the dead chestnut trees alluded to), the "nuthatching" activity of a White-breasted Nuthatch, the preening of a male Sparrow Hawk on a telegraph wire at least a half-mile away, the curious actions of a male Bluebird going in and out of a hole in a telegraph pole on the twenty-first of October (!), the feeding of a flock of American Mergansers in the mid current of a wide river, and a mixed flock of Herring and Ring-billed Gulls which the forty-times ocular resolved and identified without difficulty where the eight-times binoculars had failed, since the birds were on a tidal flat too far away to be distinguished. And the condition of such observations which makes its appeal to the observer again and again, is the ease with which one may sit at the ocular of the instrument and watch with care, and without motion or fatigue, for long periods of time, a bird or group of birds in a

clear, steady, well-lighted field of view, highly magnified, clearly and sharply focussed, and unagitated by the near presence of an observer.

However, it must not be supposed that every bird focussed upon gives a satisfactory image, or that the use of the telescope is invariably attended with the successes which have been described. For the best use of such an instrument the wind must not be strong, and the subject must be seen in the best reflected light, i. e. the sun must be toward the rear of the observer. Several disadvantages, too, attend the use of the telescope. On very warm days, objects near the ground are seen to waver in the heat waves arising from the earth, and to present distorted images in the field. When a strong or even moderate wind was blowing, unless the telescope was sheltered, there was too much vibration of the field of view. This could be partly remedied, however, by steadying the tube with one hand. For days on which observations must be made in the wind a portable steadying device is desirable. In a light wind, or on calm days, the birds in the telescope showed no motions other than their own. At first, too, there was difficulty in locating a given bird, and securing its image in the center of the field. The finder did not help much here (being designed for use only in celestial observations), and after practice was ignored altogether, and the bird located and focussed through the main tube. This was found not at all difficult to do with a little practice.

An attempt was made to devise a means whereby the altitude of soaring hawks, or other large birds, might be computed, a method which it is thought may be useful where something more than a guess is desirable. The diagram given in Fig. 1 shows the method employed. After the soaring bird (C) has been sharply focussed, the angle of the telescope tube with the horizontal is read directly from a protractor and indicator attached to the tube, and recorded. This is angle S, Fig. 1. The telescope is now directed downward toward any prominent objects in the country around (the focus remaining unchanged) which may be located on a U. S. Geological Survey topographic map of the region, such as, e. g., a sharp hillside, a village church, a railroad track, a steep declivity in a stream bank, or a tall tree in a prominent hollow or ravine. When some such object is found to lie sharply in the focus of the telescope, it

is located on a topographic map of the region, and the distance between it and the point of the observer is measured. This point is called the "focal object point," and labelled B in Fig. 1. Since the topographic maps run about one mile to the inch, it is possible to determine the distance in feet accurately enough, in an air line from the observer to the position of the "focal object." This gives us the value of the line AB (Fig. 1), and since the focus of the telescope was the same for the soaring hawk, gives us the value of line AC, as well. AB, AC, AE and ET (the latter being the vertical axis of the telescope) are now measured. Then, of the similar right

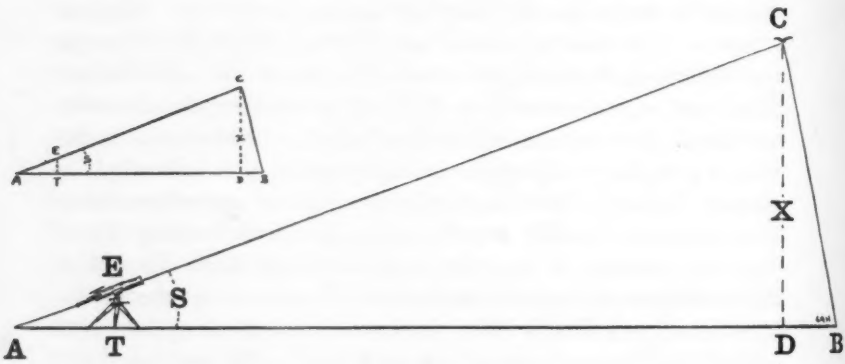

Fig. 1. Method of computing the height of soaring Hawks with an altazimuth refractor. A. Theoretical position of the observer; C. Soaring Hawk; B. Position of the "focal object;" X. Altitude; ET. Vertical axis of telescope; S. Angle of inclination of tube.

triangles, AET and ACD we know the values of AE, ET, and AC; and the altitude (X) of the larger right triangle (ACD), is easily found. Strictly speaking, the triangles should be formed with the vertex within the telescope tube, to the point where the image is formed, and the measurements of the base line of the larger triangle made from this point. But it was felt that this refinement was not at all necessary. An equally simple method of arriving at the value of the altitude, AD, is to consider that, of the isosceles triangle BAC, we know the value of the sides AB and AC, and of the vertex angle BAC. One may then construct a similar triangle, with the sides

any convenient length in inches, and in this way find value of the altitude CD.

Several tests of this method indicate that it is a useful one, and while it gives us, it is true, a very rough figure, it is thought that, in conjunction with, and as a check upon a purely unaided ocular estimate it has appreciable value.

It is not here suggested that any of these uses of the telescope should supplant the more intimate stalking and close scrutiny of birds with binoculars at short range, nor are they offered as being entirely new, except in their more precise application. In a limited application, however, it is believed that the telescope of moderate powers, and accurate adjustments has a very real service to offer to those who wish to carry on the observation of birds from one place, and to those who would study intimately the flight habits of soaring birds high in the air, or at a distance undisturbed.

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BIRDS OF CHINA.

BY RUFUS H. LEFEVRE.

BIRD-LORE has a part in the mythology of China, for next to the dragon comes the phoenix, which according to legend is a kind of Pheasant. The Chinese picture it variously; it has every color; it is a most graceful and elegant bird; it is regarded as the king of all birds but has not been seen since the time of Confucius. They have given it, too, a very kind disposition for it will not injure living insects or herbs.

The Chinese have many superstitions about birds, and a bird man would save parts of birds that he skinned for various persons desiring to be cured of illness. I also remember meeting a hunter with a Crow that he had shot, and he said he wanted to cook a certain part of it to cure his father of illness.

In the bird market in Peking, a man had a bucket of small black tadpoles for sale at a few coppers a bowl and stated that if you drank them alive they were good for the eyes. This is in line with the superstition in the use of parts of birds.

Falconry.—It is recorded that the sport of falconry had quite a place in Ancient China. The Mongol dynasty was fond of the chase with Falcons and Marco Polo writes that Kublai employed no less than seventy thousand attendants on his hawking expeditions, and speaks of trained Eagles of such size and strength that none could resist their talons. Many times have I seen natives carrying Hawks on their wrists, which are usually heavily padded. The bird has a cord to his leg and often wears a leather hood over his eyes, the hoods being for sale in large numbers in Peking. The Sparrow Hawk (*Accipter nisus*), is most frequently used, and while hunting, several times I have seen men training and using these Hawks to catch small birds. My hunter told me it requires much work to train them, and the men often sit up for several nights with their birds and keep them with them all the time before use. Some men make a regular business of capturing Hawks for falconry purposes. The North China Hawks used in falconry, says Pere David, are the Golden Eagle, Goshawk, Stevenson's Hawk, the Sparrow Hawk, the Saker, the Peregrine and the Hobby.

Domestic birds.—The Chinese Domestic Goose and the Mandarin duck are considered emblems of conjugal fidelity, and a pair is always found at wedding processions. They are also used as watch birds for the home and will give instant warning if anyone nears the house, while they will not hesitate to attack a person. I often see in memory our Chinese woman servant jumping up and down, hands waving, feet kicking and our goose holding on to her trousers and beating her with his wings. Ducks and Chickens and Pigeons are common in domestication and a few Turkeys have been introduced. In Peking the Chinese put reed whistles in the tails of birds, so that, as they fly over the city, they make a very pleasant sound.

Capture of Wild Birds.—Wild birds are in great demand for cage purposes and are also used for food so that birds of every description are captured. Where money is so scarce as it is in China, it is much cheaper to capture a bird than to pay for the gun powder to shoot it.

One of the most common methods for capturing birds is by smearing a black sticky substance on a perch, which is disguised by limbs or leaves and raised to a high place. Sometimes it is placed on a high pole which is moved about and the call of the bird imitated, or I have seen a series of perches about three feet high stuck in the ground so as to form a circle. In the center a small live bird is tied on one end of a limb which is fastened to the ground and a thread attached to the end to it. The man sits in a blind some distance away and frequently pulls the string so that the bird flutters its wings and thus attracts other birds to the perches. A similar method is used to capture large Hawks, two limbs being bent to a semicircle and placed at right angles, with a Pigeon tied to a limb as in the case of the small bird. The man sits back of the blind of stones a couple hundred feet away and pulls the thread to make the Pigeon flutter his wings. A passing Hawk is attracted and attempts to seize the bird when another string is pulled and a net is drawn over the semi-circular limbs, and the Hawk captured.

In capturing small birds, traps are often used. A two compartment cage is hung on a tree, one side of which contains a live bird, while the other has a revolving top. As the wild bird hears the call of a member of its species it comes and perches on the cage, the top gives way and it drops within the cage.

Birds like Quail, are captured with a net and the boys at Tsingtau caught quite a number in this way. The Quail would fly a short distance in the peanut or soy bean plantations and the boys, noting its position and grasping the ends of a long fishing net, would run rapidly to the place. When the Quail tried to fly it was easily captured.

Again I saw the net used to capture birds in small bushes. It was placed at the end of a row of bushes in a field and men carrying sticks slowly moved along the row on either side tapping on the bushes when the birds inside hopped into the net a third person pounced upon them.

Mr. H. T. Wade in his book, 'With Boat and Gun in the Yangtsze Valley', pp. 139–41 describes several methods I have not seen. He says:—"At the close of a cold December, some seven miles from the walled city of Kintang, near a large pond, I saw a man beckoning to me, and as I approached he asked me not to shoot the ducks in the pond. He explained that his friend was in the water; so I waited to see what would happen. After some time his friend landed, wearing a large bamboo collar or cangue, and carrying a basket containing a few wild and three tame ducks secured together by a string. He was dressed in goat-skin with the wool outside; his stockings were stitched to the clothing, and so oiled as to be nearly waterproof. Thus accoutred, he immersed his body, using the cangue as a float. On his hat were placed bunches of grass, and on the cangue two or three decoy-ducks. He slowly approached the wild fowl, and when near enough dexterously caught the unsuspecting duck by the leg, and dragged it under water. I watched him until he had gathered nearly the whole lot.

"A common method of catching Geese is to lay down a long line, to which is attached a number of thin bamboo slips, bent double, and the two ends of bamboo inserted in a bean. This bait is laid on a regular feeding ground, and the hungry goose swallows it greedily, with the result that the act of swallowing liberates the bent bamboo, which, resuming its original shape, chokes the bird."

Mr. S. Wells Williams in Vol. II 'The Middle Kingdom' page 263 says of Canton that: "Ducks are sometimes caught by persons who first cover their heads with a gourd pierced with holes, and then wade into the water where the birds are feeding; these, previ-

ously accustomed to empty calabashes floating about on the water, allow the fowler to approach and are pulled under without difficulty."

Nests of all kinds in China are robbed and the bird markets have many young birds for sale.

Shooting of Birds.—Enormous numbers of wild fowl are killed each year. The birds however, become quite wary. The rivers of China have wide open sandy shores so that the wild fowl can usually see a person a half mile or a mile away.

In central Shantung on the Wei river I saw a Chinese trying for Geese. He had lying in the sand a gun barrel that looked like a small cannon which he filled with a tremendous load of powder and shot. Then he connected the spring trigger with a thread and lay in a blind until the Geese approached. When quite a number were in front of the gun he pulled the thread and shot many of them.

The ordinary gun is an iron barrel made by a Chinese smith, usually six feet in length though some shorter ones are now being made. There is usually a stock attached to it. The gun that my collector used had a revolver grip, was at least six feet long and was fired by caps. He held it to his cheek and fired and sometimes his face was marked by the powder. The powder was homemade and the shot was of iron; the gun barrel was never cleaned. Nevertheless he could shoot rather accurately.

Foreign shot guns are being introduced but only the very rich can afford to buy them.

Cage Birds.—The Chinese love to have cage birds and as one goes through the streets he will see cages of birds hanging in the stores. The workman has his cage before him and occasionally a farmer is seen working with his bird cage on a nearby grave mound. Gentlemen of leisure who need not work often walk about the streets with a pair of bird cages. Rising early in the morning and going outside the large cities I usually saw several men together with their birds on the grave mounds. The birds were having an early morning airing and sing and often the gentlemen were seen catching insects for their birds.

One can buy many things for cage birds. Cages are of all descriptions, but not elaborate like our cages. They usually have no solid bottom, the refuse being allowed to drop to the ground floor

of the house, but the Lark cages have bottoms with sand for the bird. There are many kinds of seeds and water receptacles, scrapers and forceps to remove dirt from the cage. Worms for bird food can be purchased enclosed in small lengths of hollow stalks. Many birds are also carried on perches with strings about their necks but they flutter wildly and often injure themselves in the market.

The Lung Fu Su and Hua Fu Su markets of Peking have quite a large bird market during the migration times. We always went through these bird markets on the lookout for any new migrating species since all the men catch their birds locally.

The most popular cage bird is the "pei ling" or Mongolian Lark and Dr. Geo. Wilder said that while on a trip to Mongolia he saw them being captured and shipped to China by the tens of thousands. A notable songster will easily bring twenty-five dollars. Others however, are quite reasonable in price. In Peking the Hedge Sparrow is captured along with other Buntings, several kinds of Thrush, the Myna, Silver-eye, Greenfinch, Red-spotted Blue-throat, Siberian Ruby-throat, Titmouse and others. Any wild bird that can be captured is sold in the bird market, and I have seen there most everything from a Warbler to a Swan.

Chinese are quite friendly to the Swallow and it builds its nest on their dwellings undisturbed, and regarded as an omen of good fortune.

Training Birds.—No one but a Chinese could take the time to train birds as they do and they will spend endless time teaching them tricks. The Hawfinch, for example, is trained to sit on his perch and when a seed is thrown to him he catches it in his bill. Some small object is thrown into the air and the bird flies up and catches it and is then rewarded with a buckwheat seed. At the market in Peking I saw a man with an inverted disc about ten feet high, which looked like a drooping sun flower. Stuck into it were a number of small flags and a Hawfinch was perched about forty feet away. He would leave his perch, fly over to the flower, secure a flag and return to his perch with the flag in his bill. He was called back by the rattling of the seed box and would be at once rewarded with seed.

Gamblers along the street would also make use of these birds.

They had a number of papers laid overlapping each other near the cage. The cage would be opened, the bird would go out and pull out one of these papers with his bill and you would gamble on which one it would be.

I am often asked whether Cormorants in China really fish for men. My stay was mostly in North China and so I did not see this trick, but I quote Mr. Arthur de C. Sowerby in the February 1926 'Journal of Arts and Science' of which he is editor:—

"In China the use of Cormorants in fishing has been carried to a much greater state of perfection. The birds are tamed to the point when they can be turned loose, and work in flocks of from five to twenty, under the control of two or more men in boats, or canoes (sampans) or even on bamboo rafts. They are prevented from swallowing the fish they catch by the presence of a ring of bast or tow, tied at the base of the neck. In some cases they are carried to the fishing grounds on large boats, fitted with perches, and accompanied by a fleet of small punts or canoes, the latter each manned by two fishermen, one to manoeuvre the boat, the other to attend to the birds and their catches. Arrived at the fishing grounds, the Cormorants are unceremoniously tossed overboard, each bird immediately making for its particular punt and master, who sees to it that his charges, the Cormorants keep busy at their duties. The fleet of small boats spreads out in a line or a crescent formation, the birds all being driven in front, and when all is ready, the men on the punts and the large boat begin to shout and beat the water with the long bamboos they carry for the purpose and for controlling the Cormorants. This sets the fish moving, and forthwith the birds disappear beneath the surface of the water as they go in pursuit of the frightened fish, reappearing each time they catch a large fish or when their pouches are filled with small ones. The men in the punts keep a sharp lookout over their birds, and as soon as each appears with its prey, lifts it out of the water with a flat spoon shaped net at one end of the long bamboo, empties the fish into the bottom of the punt and throws the bird back again. And so the chase progresses till the fish have disappeared from the area being operated, when the birds are taken on board again and the whole party moves on to some other likely spot, where the manoeuvre is repeated and so on till the day's fishing is done. Sometimes and

in some parts of China the fishing is done at night, when great flares are carried on the boat, which serve to attract the fish and also to help the birds to see them. When all is over and the fishing party have returned to their headquarters, a certain portion of the fish caught is set aside and fed to the Cormorants as their share of the prize. Arrived on land, each bird is tied by the leg by a leather thong to its perch. If their home is away from the water's edge, the birds are made to sit on the long bamboos and are so carried by the men to their destination, where they are assigned to their respective perches. To prevent them from flying away their wings are mutilated when young. The stocks of cormorants are replenished from time to time by the capture of mature wild birds or by robbing the latter's nests."

"The use of cormorants as a means of catching fish is very effective, and large catches are made, but the method has its drawbacks, since the size of the fish that can be taken is limited to the capacity of the birds, a one and a half pound fish being about the maximum size that they can manage. Where large fish are plentiful, the fishermen set nets into which the fish swim when frightened by the cormorants and the noise made by the boatmen."

Number of Birds.—I have been asked, are birds as numerous in China as in America? The recent tentative list of' Birds of China' by Gee, Moffet & Wilder, lists 1031 species of birds. Dr. Geo. Wilder said he found about the same number of birds in Chihli Province as in the state of New York. Also he said that the avifauna of Peking compared favorably with that of New York City.

In the Spring and Fall of the year a great migration of birds crosses China. Most of these winter in Southern Asia, the Philippines, or other islands. They breed mostly in Siberia. I lived three years in Shantung and both in the central part of the province and along the coast, there was a very heavy migration.

There are but few new species now to be found in eastern China. There is, however, a great deal of work to be done on migration and study of habits for there are plenty of birds to be found whose habits have not been thoroughly studied.

Protection.—Could you imagine America with no bird protection whatsoever? Yet such is the condition in China. At a few places

there are a few laws but they are not enforced. A man can shoot any bird in China and I have seen Chinese returning from the hunt with Thrushes, Larks, Orioles and other fine birds which they procured to eat. The only limit is one's ability to kill birds, and Rev. Everett Johnson, of Peking, told me he once saw a man in the morning sitting under a large tree with a gun; in the evening he was still there and had a large pile of song birds beside him.

The only restriction at present is that no foreigners shall export scientific specimens. I do not know of a single Chinese who has done any real ornithological work so that this is a startling inconsistency. The country has gained everything and lost nothing by allowing foreigners to collect and study her fauna since she has no libraries or museums where its birds can be studied and would have to wait a long time until she could do this work herself.

It will be difficult for a very long time to enforce bird protection in China as the country is disorganized, and co-ordinate action on any plan must first go through a period of education.

The fact that so many species of birds do not nest in the thickly populated sections of China is what saves them from extinction.

China has had a few bird preserves. One of them was at the Tung Ling, where are the tombs of the last dynasty of Emperors that ruled China. Back of these tombs was a large forest preserve, one of the very few left in China and it was also a bird preserve. In 1923, four of us journeyed for three days by donkey and hiking to this preserve. It was the northern home of Reeves' Pheasant and had many rare species of birds not found elsewhere. What was our surprise to find that the new government allowed the President's brother to cut down all the trees and as we stood on the mountain top as far as eye could see we observed nothing but tree stumps. The underbrush had been burnt out to prevent regrowth and as we journeyed for a few days through this area we were constantly greeted by this sight. By day we saw and by night we heard the bells of the caravans of camels carrying away the timber. This meant the destruction of one of the very few great bird and animal preserves of China. It also meant denuded hills and flood.

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NOTES ON THE BIRD LIFE OF NORTHWESTERN WASHINGTON.

BY THOMAS D. BURLEIGH.

FROM the latter part of September, 1919, until the end of June, 1920, I was in Seattle, Washington, and these notes cover my experiences with the bird life of that part of the state during that time. The larger part of each week was spent in and about Seattle itself, but the week ends, especially from the latter part of the winter on, were spent at Tacoma, some forty odd miles south. For several days, however, during the latter part of March I was at Westport, in Grays Harbor County, and directly on the ocean, while short trips of a day or so were made to the Snoqualmie River, at the edge of the Cascades, and to Hoods Canal, well down the Sound.

Unfamiliarity with this region would have handicapped me considerably but I was very fortunate in early making the acquaintance of D. E. Brown, one of Seattle's veteran ornithologists, and through his cordial interest and coöperation I succeeded in soon acquiring a reasonable knowledge of the country about the city. Through him I learned of stretches of woods along the shore of Lake Washington favored by certain species uncommon elsewhere, of the wooded ridge at Kirkland, a small town on the far side of the lake, where the Band-tailed Pigeon and Oregon Jay nested, of Ravenna Park, a wooded ravine well within the city limits, where the Western Winter Wren and Varied Thrush could be found during the summer months, and of the stretch of alders and willows at Renton, a point on the lake a short distance from the city, where such species as the California Yellow Warbler, Oregon Chickadee and Gairdner's Woodpecker nested in more or less abundance. As opportunity offered I devoted my time to other spots in and about the city, lying in King County, but not with the thoroughness that perhaps they may have deserved.

It was through the hospitality of E. A. Kitchin that I found it possible to spend many week ends at Tacoma, in Pierce County. Here I had the plesaure of frequent days in the field both with him and with J. Hooper Bowles, and as might be expected I profited

to a large extent by their knowledge of local conditions. In their company I tramped the open prairie country that stretches from the edge of the city to the foot of Mt. Rainier, so unlike that about Seattle, and characterized by wide vistas of open rolling land, dotted here and there with groves of Douglas firs and, more rarely, stretches of scrub oaks. Or splashed about the large swamp south of the city, the haunt of such species as the Tule Wren, Northwestern Redwing, Coot and various Ducks, or tramped the tide flats, or hunted certain favored ravines within the city limits. The open prairie country, however, had the most appeal to me, for certain species nested there, among them the Streaked Horned Lark, the Oregon Vesper Sparrow and the Hermit Warbler, which were entirely lacking elsewhere, and never seen about Seattle during my entire stay there.

The following list is based entirely on data personally taken during my stay in Seattle, and comprises notes on the distribution, migration and breeding habits of the species observed.

Aechmophorus occidentalis. WESTERN GREBE.—Two birds were seen Dec. 21, and one bird Feb. 10, each time on Lake Washington, and feeding well in toward the shore. Possibly a fairly common winter resident here.

Colymbus holboelli. HOLBOELL'S GREBE.—This species proved to be a fairly plentiful winter resident and was frequently found on Lake Washington, but always single birds were seen, and usually they were well out from the shore.

Colymbus auritus. HORNED GREBE.—A plentiful winter resident, and especially common on Lake Washington where single birds, or at times two together, were frequently found feeding close to the shore.

Podilymbus podiceps. PIED-BILLED GREBE.—This species, in my experience at least, is of uncommon occurrence during the winter, but is a plentiful summer resident in the stretches of reeds and cat-tails that fringe the lakes and scattered swamps. A nest found April 3 in the swamp south of Tacoma held six slightly incubated eggs, and was a mass of decayed and very wet reeds, grasses, etc., floating in two feet of water at the outer edge of a stretch of reeds. No birds were seen about the nest, and the eggs were well covered with a layer of wet reeds.

Gavia immer. LOON.—A fairly plentiful winter resident, arriving early in October and remaining until early spring. I saw it at frequent intervals on Lake Washington as well as in the Sound.

Gavia pacifica. PACIFIC LOON.—Possibly like the last a fairly plentiful winter resident, although I saw it only on the Sound and then at infrequent intervals. One bird was seen Dec. 7, and two Jan. 18, each time flying by low overhead.

Brachyramphus marmoratus. MARBLED MURRELET.—I found this species quite plentiful during the winter months on the Sound, scattered small flocks being seen. A single bird was noted at Eagle Harbor on Dec. 7 that fed within ten feet of the boat landing with little or no concern for the people passing by.

Cepphus columba. PIGEON GUILLEMOT.—This species is resident here, and was seen on all my numerous trips on the Sound. When approached as they rested on the water they either flew or, if they had permitted the boat to approach uncomfortably close, they would dive and would not be seen again. One bird that was taken unawares made several ineffectual attempts to leave the water, and then became alarmed and dived. Several birds were seen Dec. 7 that were in full black and white winter plumage, while on March 21, one was for the first time seen in the complete black spring plumage.

Uria troille californica. CALIFORNIA MURRE.—Two birds were seen Jan. 18, between Seattle and Tacoma, flying by low over the water in the middle of the Sound.

Stercorarius parasiticus. PARASITIC JAEGER.—I saw this species for the first time on May 24, when it was found to be fairly plentiful in the harbor at Seattle, small groups resting on the water or flying by low overhead. Five days later, on the 29th, single birds were seen several times in the middle of the Sound between Seattle and Tacoma.

Larus glaucescens. GLAUCOUS-WINGED GULL.—This was unquestionably the commonest of the Gulls that were found throughout the winter about the docks and boat landings on the Sound. It was no uncommon sight to find fifty or seventy-five of them resting on a pier, or feeding about a garbage dump, and they likewise in good numbers followed the boats for scraps of food which experience had taught them would sooner or later be thrown to them. Often they would fly so close in the rear that they could almost be touched, and frequently, if afforded the opportunity, would rest on the rail of the upper deck.

Larus occidentalis. WESTERN GULL.—Unlike the other Gulls this was a bird of the ocean beaches and wide stretches of salt water, never, as far as my experience went, venturing far up the Sound or feeding in the harbors. Three birds were seen Nov. 28, while halfway between Seattle and Victoria, B. C., and on March 28 small scattered flocks were seen at Westport feeding with Herring Gulls on the beach fronting the ocean.

Larus argentatus. HERRING GULL.—Common throughout the winter, and frequently seen, singly or in small flocks, feeding in the harbor at Seattle, and on Lake Washington and Lake Union, about boat landings or garbage dumps, or well out from the shore.

Larus californicus. CALIFORNIA GULL.—Like the preceding common throughout the winter, and frequently seen feeding about the same boat landing or garbage dump. On Dec. 21 fully seventy-five were found on the campus of the University of Washington, feeding, scattered out, on the lawn in front of one of the buildings.

Larus delawarensis. RING-BILLED GULL.—One bird was seen Nov. 9, resting on a piling near the boat landing at Kirkland, and it evidently remained in this vicinity during the larger part of the winter for it was later seen on two other occasions, Dec. 21 and Jan. 11, resting on this same piling.

Larus brachyrhynchus. SHORT-BILLED GULL.—Three birds were seen Dec. 7 in the harbor at Seattle, feeding about the boats at anchor there.

Larus philadelphia. BONAPARTE'S GULL.—I found this species fairly common during the winter, although I invariably saw it on the Sound. March 21 a flock was seen in which there were fully a hundred and fifty of these birds, feeding in an inlet on a mud flat exposed by the low tide.

Phalacrocorax pelagicus resplendens. BAIRD'S CORMORANT.—On Nov. 29 I made the trip by boat from Seattle to Vancouver, B. C., and found this species fairly plentiful throughout the day. Single birds, or at times two or three together, were seen, and I was interested to note that they never permitted the boat to approach very close to them before flying.

Mergus serrator. RED-BREASTED MERGANSER.—This species was a fairly plentiful winter resident, small flocks being frequently seen on the Sound, resting on the water or flying by overhead.

Anas platyrhynchos. MALLARD.—I found this species resident here, and plentiful at all times. During the winter large flocks were noted on Lake Washington feeding in the stretches of reeds and cat-tails that fringed the shore. On Dec. 21 one flock was flushed from a marshy field bordering the lake near Kirkland in which there were fully seventy-five birds. On April 4 scattered pairs were seen about the large swamp south of Tacoma, and apparently few of the birds were breeding then. Less than a week later, however, on April 10, a bird was flushed from a nest that held eleven slightly incubated eggs that was in the middle of a large stretch of reeds at the upper end of this swamp. It was over a foot and a half of water, and was a substantial deeply cupped bed of short pieces of dry reeds with a slight lining of down. A second nest was found in this swamp on May 8 that held eight well incubated eggs, and a third nest, on May 15, that held one young bird, just hatched, and seven pipped eggs. This last nest was an unexpected find for the swamp had but a few days before been burned over, and other nests previously found completely destroyed. The bird must have remained on the nest throughout the worst part of the fire for the flames would otherwise not only have destroyed it, but the heat would almost certainly have ruined the eggs. Where the nest was well concealed the birds did not flush until practically walked on and then fluttered through the reeds for ten or fifteen feet before taking flight, but with this last nest there was no longer any possibility of concealment and the bird left while I was still some distance away.

Chaulelasmus streperus. GADWALL.—Two pair of these birds were seen April 3 in a stretch of open water at the upper end of the swamp south of Tacoma.

Nettion carolinense. GREEN-WINGED TEAL.—I found this species fairly plentiful during the winter, small flocks being flushed at frequent intervals from the reeds fringing Lake Washington, or more rarely from the scattered small streams and ponds. One flock of possibly twenty birds was seen Feb. 15, at Renton.

Querquedula cyanoptera. CINNAMON TEAL.—This species may possibly occur here during the winter months but from my limited experience I consider it a scarce spring migrant and a very rare summer resident. Two pair were found feeding in a stretch of open water in the swamp south of Tacoma on May 8, and later that day a female was flushed here from a nest that held four fresh eggs. It was a substantial bed of reeds and marsh grass, slightly cupped, and was over two feet of water in the middle of a wide stretch of reeds. The male was loitering close by, and the female at once rejoined him and both swam off together.

Spatula clypeata. SHOVELLER.—One pair of these birds was seen April 3 in open water in the middle of the large swamp south of Tacoma.

Dafila acuta. PINTAIL.—I found this species a rather scarce migrant here, but it is probably commoner than my few records would indicate. Two birds were seen Feb. 1, near Kirkland, resting quietly on the water a short distance out from the shore of Lake Washington, and on March 6 a flock of eight birds was flushed from a small pond on the tide flats near Tacoma.

Marila valisineria. CANVAS-BACK.—This species was fairly plentiful during the winter, small flocks being seen at frequent intervals on Lake Washington, feeding close to the shore. One flock of seven birds seen Dec. 21 was watched for several minutes, and in this casual manner a little incident witnessed that to my mind was rather interesting and somewhat out of the ordinary. Each bird was closely followed by several Coots, and on coming up from the bottom after diving for food, the Coots would at once pick off from its neck, head and even bill anything edible that was clinging there. This was apparently entirely agreeable to the bird concerned for no indignation was shown as this was repeated again and again, nor any effort made to drive the Coots away.

Marila marila. SCAUP DUCK.—Three birds were seen Oct. 25, in an inlet on Lake Washington, and from that date through the latter part of March small flocks were of common occurrence both on the Lake and on sheltered parts of the Sound.

Marila collaris. RING-NECKED DUCK.—Two pair of these birds were seen April 4, feeding in open water in the swamp south of Tacoma. I have no other record for their occurrence here.

Clangula clangula americana. GOLDEN-EYE.—One bird was seen Dec. 21, feeding close to the shore of Lake Washington, and later during the winter single birds were noted several times, but from my limited experience I consider this species a rather scarce migrant.

Clangula islandica. BARROW'S GOLDEN-EYE.—Single birds were seen Nov. 6 and Nov. 9, each time on Lake Washington.

Charitonetta albeola. BUFFLE-HEAD.—A flock of six birds, all of them males, was seen Nov. 2, feeding, well scattered out, along the shore of Lake Washington.

Oidemia americana. SCOTER.—This species rarely leaves salt water, or ventures far inland, and I recorded it but once, a flock of four birds being seen March 27, at Westport, resting quietly on the water a short distance out from the ocean beach.

Oidemia deglandi. WHITE-WINGED SCOTER.—I found this species fairly plentiful on the Sound during the winter, small flocks being frequently seen between Seattle and Tacoma. Only once were any seen on Lake Washington, a flock of six birds being noted there Dec. 6.

Oidemia perspicillata. SURF SCOTER.—Like the last this species was fairly plentiful during the winter on the Sound, and practically always the single birds or small flocks seen were well out from the shore. March 25, I was at Hoods Canal, and found the birds unusually plentiful there that day.

Erismatura jamaicensis. RUDDY DUCK.—Small flocks were seen during the winter on Lake Washington, and during April several males were noted in the swamp south of Tacoma where there is a possibility that they nested.

Botaurus lentiginosus. BITTERN.—My first record for this species for the spring migration was April 10, a bird being heard "pumping" from the edge of the large swamp south of Tacoma. It was heard here frequently for the following month or so, and possibly nested, although breeding records west of the Cascades are very rare.

Ardea herodias fannini. NORTHWESTERN COAST HERON.—I saw this bird for the first time on Dec. 7, on a buoy in the harbor at Seattle, and during the remainder of the winter single birds were seen at frequent intervals both on the Sound and about Lake Washington. While at Renton on March 14 I witnessed what was seemingly a courtship flight, eight birds circling and soaring high overhead, occasionally tumbling swiftly in pursuit of each other and then rising again until a mere speck in the sky.

Rallus virginianus. VIRGINIA RAIL.—This species is seemingly resident here, and fairly plentiful in the stretches of reeds and cat-tails bordering the scattered swamps and larger bodies of open water. One bird was flushed on Dec. 13 from the reeds fringing the shore of Lake Washington, and on April 10 several were seen in the large swamp south of Tacoma where in past years they have been found breeding.

Fulica americana. COOT.—Resident, and plentiful throughout the year. Oct. 12 fully a thousand birds were found on Lake Washington, scattered everywhere, close to the shore and well out toward the middle of the Lake, and this proved no uncommon sight during the winter months. On April 4 I spent several hours wading through the swamp south of Tacoma and succeeded in finding five nests, two with nine eggs each, one with eight, one with seven and one with six. All were well out from the

shore, over several feet of water, and were substantially built of pieces of green reeds, the lining being of the same material but dry and of pieces well crushed. Two other nests were found here April 10, in each nine slightly incubated eggs, and while again in this swamp on May 8, another nest was found with five fresh eggs. I never succeeded in actually flushing a bird from a nest, but both would sooner or later appear and show great concern over my intrusion. At one nest both birds appeared and seemingly attempted to distract my attention by coming within a few feet of me and, rising out of the water, splashing vigorously with both feet, repeating this until I wearied watching them.

Gallinago delicata. WILSON'S SNIPE.—I found this species fairly plentiful during the winter, single birds being frequently flushed from marshy spots bordering the Lake. June 6 two birds, both of them undoubtedly males, were seen, late in the afternoon, circling high over a marshy field near Tacoma, dropping at times with a loud hollow rumble and then flying swiftly on again. This "courtship" flight, and the late date, seem conclusive evidence that these birds were breeding here although they have never been recorded before west of the Cascades during the summer months.

Macrorhamphus griseus scolopaceus. LONG-BILLED DOWITCHER.—One bird, an early migrant, was seen March 28 at Westport, feeding at the edge of a small pond in an open field.

Pelidna alpina sakhalina. RED-BACKED SANDPIPER.—During the four days that I was at Westport, from the 27th through the 30th of March, I found this species fairly plentiful on the ocean beach. Small scattered flocks of from three to eight birds were seen, feeding at the water's edge or among the scattered drift wood, in the latter case often some distance from the water.

Ereunetes mauri. WESTERN SANDPIPER.—A flock of possibly thirty-five birds was seen at Westport, March 29, feeding on the ocean beach. This species does not winter here, so this record is of interest as evidence of the early date that these birds migrate north.

Crocethia alba. SANDERLING.—This species was not noted during my first two days at Westport but March 29, three were seen feeding on the ocean beach, and the following day they were found to be unexpectedly fairly plentiful. Small scattered flocks were seen that day, both at the water's edge and well up among the scattered driftwood.

Helodromas solitarius cinnamomeus. WESTERN SOLITARY SANDPIPER.—I have but one record for the occurrence of this species here for it is a rather scarce migrant. A single bird was seen May 8 at the edge of the swamp south of Tacoma.

Actitis macularia. SPOTTED SANDPIPER.—This species is said to winter here sparingly but it was not until May 9 that I noted it for the first time, a single bird being seen feeding at the edge of a pond on the tide flats near Tacoma.

Oxyechus vociferus. KILLDEER.—Resident, and fairly plentiful where

conditions were suitable. During the winter small noisy flocks were seen, feeding on marshy ground bordering Lake Washington, or about small streams in open fields, but by the first week in March the birds had paired off and were noted then in pastures or open fields away from water where they undoubtedly nested.

Aegialitis nivosa. SNOWY PLOVER.—A single bird was seen March 27 at Westport, feeding close to the water's edge on the ocean beach. This was my only record for this species here so it evidently breeds but sparingly.

Colinus virginianus texanus. TEXAS BOB-WHITE.—This species has of recent years been introduced about Tacoma but apparently is increasing but slowly there. I recorded it but once, two birds being flushed May 9 from the edge of an open field.

Lophortyx californica californica. CALIFORNIA QUAIL.—This species has likewise been introduced here and has increased in numbers each year until at present it is remarkably plentiful. It was no uncommon occurrence during the winter to flush three or four coveys, in each from twenty to forty birds, while taking a short tramp through the open country about Seattle. A light fall of snow on Dec. 13 brought the birds out into the open and they were much in evidence that day as they fed on many of the roads well within the city limits. My first nest, that held fourteen fresh eggs, was found May 30 at Tacoma. It was a slight hollow in the ground thickly lined with dry Douglas fir needles, in which many feathers of the incubating bird were mixed, and was well concealed under a dried out fir branch lying on the ground at the edge of a short stretch of open woods. The following morning a bird was flushed from another nest that held eighteen slightly incubated eggs, a hollow in the ground thickly lined with dry grasses concealed under an old limb lying in a small clump of bushes at the edge of a short stretch of open woods. Later that same day I found a third nest by practically walking on the bird as I stepped over an old log that was lying in a small clearing in a steep wooded ravine. It held nineteen incubated eggs, and was a mere hollow in the ground at the side of and partly under the log, lined well with grasses.

Dendragapus obscurus fuliginosus. SOOTY GROUSE.—This was a bird of the deeper woods, and large stretches of thick timber, but in such spots as this it was fairly plentiful. At intervals during the winter single birds were flushed from the side of a road or trail through the woods, and on March 21 one was heard hooting for the first time. I spent the larger part of the day on April 18 at Kirkland and birds were frequently heard then hooting deep in the woods. But one was seen indulging in this odd form of "courtship," and it was in the top of a large Douglas fir well out toward the end of a branch where it was rather conspicuous for some distance. A nest was found May 30 at Tacoma that held seven well incubated eggs, a slight hollow in the ground lined with dry oak leaves and a few feathers, in the middle of a small clump of scrub oaks a short distance out on the open prairie near a stretch of open woods. Another

nest with seven well incubated eggs was found June 2 at Kirkland. It was a hollow in the ground in a depression under an old log lying in the middle of an open slashing in the woods, and lined merely with the litter that covered the ground here, dead leaves, twigs etc., and a few feathers from the incubating bird.

Bonasa umbellus sabini. OREGON RUFFED GROUSE.—Fairly plentiful in the scattered short stretches of woods where single birds were flushed at frequent intervals during the winter months. A bird was heard drumming for the first time on March 20, and on May 23, at Tacoma, a female with newly hatched young was seen in the middle of a short stretch of open woods. As I approached the young scattered in all directions and the old bird displayed real courage in their defense. charging, with feathers puffed out and tail spread, to within five feet of me, hissing vigorously and uttering a peculiar whine.

Phasianus torquatus. RING-NECKED PHEASANT.—I saw this species for the first time on Dec. 21 when seven birds, four of them males, were flushed from the edge of an open field at Kirkland. It is unquestionably increasing steadily in numbers since its introduction here, and is fairly plentiful now. While at Renton, April 25, males were frequently heard during the day uttering their peculiar short "crow" from the edges of short stretches of woods.

Columba fasciata fasciata. BAND-TAILED PIGEON.—I found this species one of the scarcest of the breeding birds here, and during the spring saw it only on the thickly wooded ridge near Kirkland. On May 26 while following a trail here through a stretch of thick second growth Douglas fir I flushed a bird from a nest that held one slightly incubated egg. It was fifteen feet from the ground in a crotch of a small somewhat bent Douglas fir within ten feet of the trail, and although rather flat was quite substantially built of large coarse fir twigs. Because of its size, and the fact that no attempt had been made at concealment, it was by no means inconspicuous but the bird did not leave until the tree was touched.

Cathartes aura septentrionalis. TURKEY VULTURE.—A fairly plentiful summer resident. I saw it for the first time during the spring on April 11, ten birds being noted that day soaring and circling together high overhead.

Circus hudsonius. MARSH HAWK.—This species was seen at irregular intervals during the winter months and apparently is an uncommon migrant. The first bird appeared on Oct. 25, being found that day feeding over marshy ground fringing Lake Washington.

Accipiter velox. SHARP-SHINNED HAWK.—I saw this species but twice during the latter part of the winter, but it may be commoner than my records indicate. One bird was seen Feb. 29 at Kirkland, and on March 6 a bird was observed in the open prairie country south of Tacoma, hovering over a field in which a flock of Streaked Horned Larks were feeding and causing them much evident uneasiness.

Accipiter cooperi. COOPER'S HAWK.—This species is a scarce breed-

ing bird, and by no means common at any time during the year. Two were seen April 18 at the edge of a stretch of woods where a nest had been found the previous year, but I was unsuccessful in locating the nest that they were possibly then using.

Buteo borealis calurus. WESTERN RED-TAIL.—At irregular intervals during the spring a single bird was seen at Kirkland, soaring high overhead. Very probably it was breeding somewhere close by, although this species is very rare as a breeding bird, and in fact throughout the larger part of the year.

Buteo swainsoni. SWAINSON'S HAWK.—I have but one record for the occurrence of this species here. On Feb. 15 one bird was seen at Renton, flying slowly by overhead.

Haliaeetus leucocephalus leucocephalus. BALD EAGLE.—While at Westport a single bird was seen March 28 feeding on the ocean beach. Judging from its dark plumage it was a young bird of the past spring.

Falco columbarius columbarius. PIGEON HAWK.—This species is of regular occurrence during the winter, but by no means common. One bird that was seen Dec. 28 darted suddenly into a nearby thicket as I stood watching it and carried off a Rusty Song Sparrow that I had not even realized was there, flying so swiftly that it was gone before I understood fully what it was doing. Another bird seen Jan. 25 was on a telephone wire at the side of a road, and permitted me to approach directly beneath it without showing the slightest concern.

Falco sparverius phalaena. DESERT SPARROW HAWK.—Resident, and fairly plentiful about slashings and open fields. Single birds were seen at frequent intervals during the winter months but it was the latter part of March before this species was at all plentiful or much in evidence.

Asio flammeus. SHORT-EARED OWL.—This species has been found breeding on the tide flats near Tacoma but is rather uncommon during the summer months. I found it fairly plentiful however during the winter and frequently saw it, even at noon when it was somewhat cloudy, beating low over open marshy fields in search of food.

Cryptoglaux acadica scotaea. NORTHWESTERN SAW-WHET OWL.—There are few actual records for the occurrence of this species here so I was rather fortunate in seeing one bird during my stay in Seattle. I was passing a hillside covered with rather thick underbrush when my attention was attracted to a sudden commotion among a flock of Bush-Tits near me, and an investigation showed this little Owl to be the cause of their excitement. It was in a thick bush and very well concealed for I had passed very close to it without seeing it, and then was within a few feet of it before I finally noticed it watching me closely. This was on Feb. 19, so whether it was a breeding bird or not is uncertain.

Otus asio kennicotti. KENNICOTT'S SCREECH OWL.—Only at infrequent intervals did I see this species here although it is said to be fairly common as a breeding bird. Three birds, two of them young of the year fully grown but with their feathers still fluffy, were seen June 16, scattered

in several small firs at the side of a path through a short stretch of woods.

Bubo virginianus saturatus. DUSKY HORNED OWL.—I saw this species but once, on Dec. 14, one bird being frightened from the top of a Douglas fir in a stretch of thick woods near Kirkland.

Glaucidium gnoma grinnelli. COAST PYGMY OWL.—My experience with this tiny Owl was limited to a bird seen Jan. 1 that was brought in alive to D. E. Brown. It was caught after it had killed a Rusty Song Sparrow and was trying, without much success, to carry it away.

Coccyzus americanus occidentalis. CALIFORNIA CUCKOO.—This species was fairly plentiful in the scattered short stretches of thick swampy woods bordering Lake Washington, but scarce elsewhere. I saw it for the first time in the spring on June 8, a rather late date in my opinion for the first record for the spring migration. Within a few days however single birds were frequently seen or heard about the Lake.

Ceryle alcyon caurina. NORTHWESTERN BELTED KINGFISHER.—Resident, and plentiful, both on the Sound and about fresh water. A favored spot during the winter months was a piling in any of the numerous harbors, for it was here that birds were often seen. On March 24, one was noticed leaving a hole in a high bank in an inlet on the Sound where evidently it had already begun nesting.

Dryobates villosus harrisi. HARRIS'S WOODPECKER.—It was Oct. 29, over a month after I had arrived in Seattle, before I saw one of these birds for the first time, and only at infrequent intervals was one seen later during the winter. It apparently is more plentiful in the mountains for while at Snoqualmie Nov. 15 birds were frequently seen in the open slashings and about the logging camps. A nest was found at Tacoma, May 31, with noisy young, that was twenty feet from the ground in a fir stub in the middle of a large open slashing.

Dryobates villosus orius. SIERRA WOODPECKER.—A Hairy Woodpecker seen at Kirkland Dec. 21 aroused my suspicions because of its unusually white underparts so it was shot and proved to be this subspecies. Being the breeding form east of the Cascades it is not surprising that an occasional bird should wander across the mountains to the coast.

Dryobates pubescens gairdneri. GAIRDNER'S WOODPECKER.—This species was quite plentiful, and frequently seen in the scattered short stretches of woods. A nest found May 17, in a wooded ravine on the campus of the University of Washington, held three slightly incubated eggs and was fifteen feet from the ground in a dead limb of a large Oregon maple. Another found May 19 at Renton held five well incubated eggs and was fifteen feet from the ground near the top of an old rotten willow stub at the edge of a stretch of underbrush bordering a stream.

Sphyrapicus ruber notkensis. NORTHERN RED-BREASTED SAPSUCKER.—I have but two records for the occurrence of this species about Seattle, although it is said to breed sparingly. On Dec. 16, and again on April 12, an adult male was seen in the same short stretch of woods.

Phloeotomus pileatus picinus. WESTERN PILEATED WOODPECKER.—

One bird was seen Feb. 29 in a stretch of woods near Kirkland, lustily drumming in the top of a large dead fir, and on April 17 two were seen in a wooded ravine in Washington Park well within the city limits of Seattle. There is little question in my mind that this pair nested here for later a single bird was found at this spot several times but my efforts to find the nest were unsuccessful.

Asyndesmus lewisi. LEWIS'S WOODPECKER.—This species was a fairly plentiful summer resident, and was found in open slashings and about dead trees at the edge of fields and clearings in the woods. It was first seen in the spring on May 6, and within a week was reasonably abundant.

Colaptes cafer saturatior. NORTHWESTERN FLICKER.—Resident, and plentiful throughout the year, especially in the more open country. My first nest was found May 20, and held on that date seven fresh eggs. It was twelve feet from the ground, and was a cavity twenty inches deep near the top of an old rotten alder stub near the edge of a short stretch of woods. Another found May 31 at Tacoma held but four well incubated eggs, and was thirty-five feet from the ground in a tall dead fir in a clearing in a wooded ravine. A third found June 13 at Tacoma held seven slightly incubated eggs and was twenty feet from the ground in a dead limb of a large apple tree at the side of a road.

Chordeiles virginianus hesperis. PACIFIC NIGHTHAWK.—I noted this species for the first time in the spring on June 6, a single bird being seen feeding over the business district of Seattle. Within a few days however these birds were fairly plentiful, both in the city and in the open country. A nest was found June 25 on a stretch of open prairie near Tacoma that held one slightly incubated egg, the egg merely lying on the gravelly soil in a slight depression recently rooted up by a hog.

Cypseloides niger borealis. BLACK SWIFT.—While at Kirkland June 14, I had the unexpected pleasure of seeing a flock of fully a hundred of these birds drifting by overhead in small scattered groups. They were working southeast toward the Cascades, and as it was a gloomy windy afternoon they were feeding considerably lower than I am told they are usually seen, giving me a much appreciated opportunity of seeing them at close range. Eight days later, on June 22, the weather was again gloomy and rainy, and toward the middle of the morning I saw a flock of possibly thirty of these birds circling and feeding low over a stretch of woods.

Chaetura vauxi. VAUX'S SWIFT.—A fairly plentiful summer resident, and seen first in the spring on May 10, three birds, feeding overhead. That this species is gradually adapting itself to civilization is evidenced by the fact that on June 16 two birds were seen dropping down into a large chimney on the campus of the University of Washington where they were unquestionably nesting. Actual records of breeding in other than hollow trees are very scarce, and it will be interesting to see if chimneys will in time be generally accepted as suitable nesting sites.

Selasphorus rufus. RUFOUS HUMMINGBIRD.—A plentiful summer

resident, and one of the earliest of the migrants to appear in the spring. One bird was seen March 27 at Westport, and although the weather that week was gloomy and rather cold they were found to be actually plentiful the following day in the open woods near the beach. It was March 31 before I was again in the woods about Seattle but that day I saw one of these birds at frequent intervals, and recorded them in my note book as already fairly plentiful. My first nest was found May 9 at Tacoma and held two slightly incubated eggs. It was eight feet from the ground at the outer end of a drooping limb of a large Douglas fir in a short stretch of open woods, and was compactly built of white plant down, covered on the outside with green moss and then numerous lichens. My experience with western Hummingbirds, in so far as their breeding habits are concerned, has been rather limited but I know of no other species that invariably covers its nest in this manner with fresh green moss. Four other nests were later found, and each time the moss had been used, this characteristic, together with its large size, making the nest one not easily confused with any other of this family. Each of the other nests held two slightly incubated eggs, two being at the outer end of drooping limbs of Douglas firs, one on a dead twig at the outer end of a limb of a small scrub oak on the open prairie near Tacoma, and the last but two feet from the ground in a spirea bush at the edge of a short stretch of woods. June 20 was the latest date on which a nest with eggs was found.

Tyrannus tyrannus. KINGBIRD.—This species is seemingly rather scarce as a breeding bird, and very local in its distribution during the summer months. I noted it for the first time in the spring of June 4, one bird being seen at the edge of an open field near Renton.

Nuttallornis borealis. OLIVE-SIDED FLYCATCHER.—A fairly plentiful summer resident, scattered pairs being found at the edge of slashings and in open spots in the woods. My first record for the spring migration was a bird seen May 26 at Kirkland, in the top of a large dead fir in a clearing deep in the woods.

Myiochanes richardsoni richardsoni. WESTERN WOOD PEWEE.—This species was likewise a fairly plentiful summer resident, and was seen in many of the scattered short stretches of woods. The first bird appeared in the spring on May 19, and by the 21st all were apparently back from their winter home in South America.

Empidonax difficilis difficilis. WESTERN FLYCATCHER.—A very plentiful summer resident, with an evident preference for cool moist ravines and thick woods. My first record for the spring migration was April 26, one bird being seen in an open wooded ravine. By the 30th they had become fairly plentiful and were seen daily thereafter. My earliest breeding record was a nest found May 20 with four fresh eggs, my latest a nest found June 25 with three slightly incubated eggs. At almost any time between these two dates it is possible to find fresh eggs so it is probable that two broods are raised by a few of the birds at least. Four eggs are usually laid for of ten nests personally seen seven held four eggs while

but three held three. The situation of the nest varies widely, far more so than with any other species with which I am familiar, excepting perhaps the Robin. This was rather unexpected, and decidedly interesting to me, for it was so at variance with the breeding habits of the other species in the genus Empidonax which it so closely resembles. One nest that I saw was seven feet from the ground in the hollow end of a rotten limb of a large oak, another was four feet from the ground in a bush in a thicket, a third was well concealed in the upturned roots of a recently fallen fir at the side of a stream, a fourth was placed between the trunk and a loose piece of bark on a small dead oak in a stretch of open woods, while a fifth was on a beam against the side of a partition in an old shed. Actually no two nests were situated alike, but fortunately there was little difference in their construction so there was never any question as to their identity. They were built, at times compactly but again rather loosely, of green moss intermixed with fragments of dead leaves, bits of rotten wood and shreds of bark, well cupped in the top and lined with fine grasses, gray plant fibres and, rarely, a few feathers or a few dry fir needles.

Empidonax trailli trailli. TRAILL'S FLYCATCHER.—A plentiful summer resident, but with such a decided partiality for fields or slashings overgrown with scrubby underbrush that it was rarely seen elsewhere. It was a late migrant for while the first bird was noted May 26 it was ten days later before it was finally common. It likewise nested late for it was June 22 before I found my first nest that held four fresh eggs. It was five feet from the ground in a thick bushy alder at the edge of a field overgrown with scrubby underbrush, and was well built of weed stems and grasses, lined with fine grasses and at the sides large white chicken feathers that curled well over the top. Two other nests were found in situations similar to this, and also alike in construction, even to the large chicken feathers that curled over the top, one June 23 with four fresh eggs and the other June 26 with three eggs incubated possibly two days.

Otocoris alpestris strigata. STREAKED HORNED LARK.—This species is rarely seen about Seattle and breeds only in the open prairie country south of Tacoma. Here however, it is plentiful during the summer months, and one of the characteristic birds of this part of the state. Oddly enough, considering the mild winters, these birds invariably disappear in the fall and are not seen again until the following spring. In the east the Horned Larks are unaffected by the severest winters, and regardless of deep snows and zero weather feed unconcernedly in fields exposed to the full force of the frequent blizzards, so this inconsistency is hard to understand. Feb. 8 I spent part of the day tramping over this open country about Tacoma but none of these birds was seen, and it was not until Feb. 25 that the first birds appeared, a flock of fully seventy-five being seen feeding in a recently plowed field. They apparently also breed rather late for it was not until May 29 that I found a nest that held four half incubated eggs. It was sunken flush with the ground at the base of a thick clump of grass on an open golf course, and was substantially built of fine grasses.

Cyanocitta stelleri stelleri. STELLER'S JAY.—This large handsome Jay is quite plentiful here, and is a conspicuous part of the winter bird life for small noisy flocks are frequently encountered then wandering through the scattered short stretches of woods. Early in March they become quieter, gradually pair off, and by the end of the month are very largely engrossed in domestic duties. On March 19, a female, closely accompanied by the male, was seen gathering nesting material from the ground, and on being watched for a few minutes she soon revealed the nest, half built, in a small Douglas fir close by. There was one fresh egg in this nest March 31, but my curiosity seemingly proved objectionable for the nest was later found deserted. This trait of deserting a nest if it was touched before the eggs were laid is evidently not uncommon for another nest found April 18 with three fresh eggs, also in a small Douglas fir and five feet from the ground, was likewise never used. My first nest with a full set was found April 19 and held five slightly incubated eggs. It was eighteen feet from the ground at the outer end of a small bent Douglas fir overhanging a path in a wooded ravine, and was bulkily built of coarse twigs, rootlets, pieces of rotten wood and considerable mud, well cupped and lined with rootlets and fine grasses. Another, found April 22 with four well incubated eggs, was twenty-five feet from the ground in the top of a small Douglas fir deep in the woods, and like the last was rather bulky, and by no means inconspicuous.

Perisoreus obscurus obscurus. OREGON JAY.—This bird is said to be not uncommon through the mountains although while at Snoqualmie Nov. 15, I saw it but once, six being found feeding on a garbage dump at the edge of a logging camp. At Seattle it was decidedly scarce, and was seen only in a stretch of thick woods near Kirkland. Here I spent two afternoons, on April 18 and again on May 12, watching two birds as they silently fed together in the upper branches of the larger firs, but at no time did either of them give me the slightest clue as to the location of their nest. That they were nesting at the time was shown quite conclusively on June 2, when the two adult birds were seen at this spot with three fully grown young, the latter easily recognizable by their darker plumage.

Corvus brachyrhynchos hesperis. WESTERN CROW.—Plentiful throughout the year although more in evidence during the winter months when flocks of twenty to thirty birds were frequently seen. Unlike the Crow in the east they apparently had no fear of man and were frequently found feeding on lawns or in vacant lots well within the city limits of Seattle with no concern whatsoever over the people walking by. My first nest was found April 25 at Renton and held four slightly incubated eggs. It was twenty feet from the ground in a crotch of a partially dead willow in underbrush bordering a small stream, and was compactly built of coarse twigs, grasses, strips of bark and mud, well cupped and lined with fine strips and shreds of cedar bark, cow hair, horse hair and pig bristles. Two other nests were found April 27 in short stretches of open fir woods on the University of Washington campus, both twenty-five

feet from the ground in the top of one of the smaller trees, and differing little in construction from the first nest. One held five fresh eggs, and the other four.

Agelaius phoeniceus caurinus. NORTHWESTERN RED-WING.—This species was seen wherever there were any stretches of reeds or cat-tails, and as these fringed the shore of Lake Washington in many places the birds were as a result quite plentiful. Large flocks were seen during the fall, often feeding at the edge of open fields, but they gradually disappeared during the latter part of November and only a few small scattered flocks wintered. May 8 I spent part of the morning in the large swamp south of Tacoma and here I found these birds breeding abundantly. Within an hour I had glanced into nineteen nests, five of which were but half built, while ten held eggs, three held young, and from one the young had already flown, showing a surprising irregularity in the date that individual pairs nested. All were two feet above the water, in clumps of reeds or thick marsh grass well out from the shore, and were compactly built of reed stems, matted fragments of reeds and mud, rarely bits of paper and in one nest dead willow leaves, lined well with fine grasses. On June 13, a small colony of these birds was found breeding in a field overgrown with scrubby underbrush and two nests were seen, one with two fresh eggs and the other with three well incubated, both three feet from the ground in small bushy alders, and built of weed stems, grasses and mud, lined with fine grasses.

Sturnella neglecta. WESTERN MEADOWLARK.—Resident, and plentiful, occurring wherever open fields were found. Many breed in the open prairie country south of Tacoma and here they are said to be consistently robbed by Crows which carefully search the grass for their nests throughout the spring and early summer.

Euphagus cyanocephalus. BREWER'S BLACKBIRD.—This species is resident here but in my experience not very plentiful at any time during the year. Small flocks were seen at intervals during the winter, and on May 15 a small colony of possibly eight or ten pairs was found breeding on a brush covered hillside near Tacoma.

Hesperiphona vespertina montana. WESTERN EVENING GROSBEAK.—I found this species a plentiful winter resident, arriving early in October and lingering until late in the spring. Five birds were seen Oct. 2, feeding in the upper branches of a dogwood sapling at the side of a road, and within a month small flocks were found in many of the short stretches of woods. Usually eight or ten birds were seen together, although large flocks were not uncommon. Jan. 10 fully fifty birds were noted feeding on the ground beneath several bushes at the edge of an open field. They evidently breed late for they were still fairly plentiful at Tacoma June 13, and were as yet in small flocks.

Carpodacus purpureus californicus. CALIFORNIA PURPLE FINCH.—Resident, but a little scarce during the winter, being seen then at infrequent intervals. Small flocks were especially numerous the latter part of

October, one in which there were possibly thirty birds being found, on the 24th, feeding on the seeds of a large Oregon maple at the side of a road. A nest found near Tacoma on May 31 held five slightly incubated eggs, and was fifty feet from the ground and twenty feet out at the outer end of a limb of a large Douglas fir at the edge of an open slashing. It was small but compact, and was built of twigs, rootlets and usnea moss, slightly lined with gray plant fibres and a few fine grasses.

Loxia curvirostra minor. CROSSBILL.—It was not until Dec. 26 that this species was noted for the first time a flock of fifteen birds being seen flying noisily by overhead. Almost at once, however, it was quite plentiful, and remained so until late in the spring. Invariably small flocks were encountered that were restless and noisy, and seldom remained in one spot long. It would be interesting to know when and where this species breeds for a flock was seen June 23, in which there were fully sixty birds, and at this late date they might reasonably be expected to be at least considering domestic duties.

Astragalinus tristis salicamans. WILLOW GOLDFINCH.—This species was quite plentiful during the fall, flocks of from ten to fifty birds being seen in the open country about Seattle, feeding on weed seeds in fields or slashings. Early in November these flocks gradually disappeared and only at long intervals during the winter was an occasional bird seen. By the middle of March however they had become fairly plentiful again, and remained so throughout the spring and early summer. Considering the late date at which the Goldfinch breeds in the east, the latter part of July and the first of August, I felt that these birds nested early for on June 18 I found my first nest, with five slightly incubated eggs, and, within the next week, four other nests with eggs. They were, without exception, within six or eight feet of the ground in the top of bushes in fields overgrown with scrubby underbrush, and were compactly built of grasses, gray plant fibres, shreds of bark, fine rootlets and plant down, deeply cupped and lined with down. Five eggs is evidently the number usually laid for but one nest, the last found on June 26, held six.

Spinus pinus. PINE SISKIN.—I was told that this species varies in abundance year by year, being scarce at times and again quite plentiful, so I was probably fortunate in finding it very plentiful. Large flocks were seen during the winter, and as they were restless then, and noisy, they were much in evidence. My first nest was found at Kirkland May 12, and held four half incubated eggs. It was twelve feet from the ground at the outer end of a drooping limb of a large Douglas fir in a grove of firs at the side of a road, and in appearance reminded me very much of a Chipping Sparrow's nest, being small and compactly built of twigs, rootlets, weed stems and grasses, well lined with horse hair. Seemingly there is considerable variation in nests of this species for another found May 14 resembled an Audubon Warbler's found earlier in the month as it was much larger and more deeply cupped, and was compactly built of twigs, rootlets, pieces of white string, a few grasses and downy spiders' egg cases,

well lined with rope fibre and then horse hair and a few feathers. It held four fresh eggs, and was fifteen feet from the ground at the outer end of a limb of a Douglas fir at the edge of a cemetery. A third nest found May 17 held four fresh eggs, and was twenty feet from the ground at the outer end of an upper limb of a Douglas fir at the edge of a short stretch of woods and facing an open field. It too was large and deeply cupped, and was compactly built of twigs, rootlets, weed stems, green moss and a few grasses, lined with fine rootlets, large white chicken feathers and one horse hair.

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(*To be concluded.*)

THE SCOPS OWLS OF NORTHEASTERN AFRICA.

BY HERBERT FRIEDMANN.

IN connection with my studies of the East African birds in the United States National Museum and the Museum of Comparative Zoölogy, I have had the occasion to become familiar with the difficulties presented by the plumage variations of the little Scops Owls. Recently, Dr. James P. Chapin has also been studying these puzzling birds, and has, I understand, prepared a paper on the forms found in the Belgian Congo. As he has pointed out to me in correspondence, the lack of adequate series in any museum renders more difficult a problem inherently complicated, and, while he has encouraged me in the description of the form presented in this paper, he has also cautioned that the describer of a new race of *Otus senegalensis* must be prepared to face a good deal of criticism from other workers. Nevertheless, I hope to show that the bird of Ethiopia (for which no name is available) is a recognizable race.

Erlanger (Journ. f. Ornith., 1905, pp. 235–237) considered Ethiopian and Kenian and Tanganyikan birds subspecifically identical but noted that the individual variation in his series was very great. Zedlitz (*ibid.*, 1910, p. 734), also "lumped" the birds of northeastern, eastern, and southern Africa as *Pisorhina capensis capensis*, but definitely stated that the birds of the northeastern part of the continent were so considered only temporarily, as further study and more material might very likely show them to be separable. He also found that a bird from Tacazzé, northwestern Tigre district, was much lighter than a specimen from Salamona, on the Danakil-Tigre border, and suggested that it might some day be shown that there were two races involved, a dark eastern one, and a light, western form.

While with the Childs Frick Expedition Dr. E. A. Mearns collected three Scops Owls at Dire Daoua and Sadi Malka, east-central Ethiopia. These are darker than any others examined in a series of some twenty birds from the rest of Africa. Dr. Chapin informs me that in 1921 the darkest specimen in the British Museum collection was a bird from Undel Wells, Ethiopia. A male from the Northern Guaso Nyiro River, Kenya Colony, in the Mu-

seum of Comparative Zoölogy (G. M. Allen coll.) agrees fairly well with the dark Ethiopian birds. It follows, therefore, that there is a dark, heavily vermiculated race in Ethiopia (except the extreme northwestern part—Tacazzé) and northern Kenya Colony. The question of names then arises. Madarasz (Orn. Monatsb., 1912, p. 81) described a bird he called *Scops kōnigseggi*. This bird is said to be very light in color; the ground color of the upper parts white and light gray without a brownish wash, with some yellowish flecks here and there, particularly on the upper back and on the inner webs of the tertials. Fortunately I have examined three birds from the Blue Nile, and two of them agree with Madarasz' description, while the third is very much more rufous. However, *kōnigseggi* is a light, sparsely vermiculated bird both by description and by specimens, and the name cannot be applied to the dark birds of Ethiopia. Zedlitz' light bird from Tacazzé may well be *kōnigseggi*. I have not been able to see the description of Brehm's form *pygmaea* (Vogelfang, 1855, p. 43) but it probably refers to the same birds as does the name *kōnigseggi* which it antedates by some 57 years. The type of *pygmaea* came from Sennar and is now in the Tring Museum. Hartert (Nov. Zool. XXV, 1918, p. 38) considers it a synonym of typical *Otus senegalensis senegalensis*, but this is not necessarily the case, as Hartert recognizes none of the various races of this Owl—a course with which I do not agree. At any rate *pygmaea* (or *senegalensis*) is the lighter owl of Tacazzé, Sennar, and the Blue Nile.

For the dark, heavily vermiculated bird of central and eastern Ethiopia, and northern Kenya Colony I propose the name

Otus senegalensis caecus subsp. nov.

Type: U. S. Nat. Mus. no. 243663, adult female, collected at Sadi Malka, Ethiopia, 1 February 1912, by E. A. Mearns.

Subspecific Characters: darker, more heavily vermiculated (the light spaces between the dark marks narrower) than in any other race of the species.

Measurements of Type: wing 128, tail 56, culmen from the cere 10.5 mm.

Range: the eastern and central parts of Ethiopia south to the northern Guaso Nyiro River, Kenya Colony.

Specimens Examined: Otus senegalensis pygmaea (or *senegalensis* according to Hartert), Blue Nile, 3; *Otus senegalensis ugandae*, Uganda and northern Belgian Congo, 10; *Otus senegalensis caecus*, Ethiopia and Kenya Colony, 4.

Remarks: The four specimens of *caecus* examined (3 females, 1 male) vary somewhat among themselves (the darkest bird being the type) but all are darker than any other Scops Owls examined. The argument commonly advanced against subspecific entities in this species that this Owl is always extremely variable in any region may be disposed of by recording that a series of ten specimens of *ugandae* from Uganda and the Uelle district, Belgian Congo, shows little or no variation in color.

U. S. National Museum,
Washington, D. C.

THE REDISCOVERY OF THE ST. LUCIAN BLACK FINCH (*MELANOSPIZA RICHARDSONI*).

BY JAMES BOND.

FEW birds have had such a remarkable history and have remained for years so utterly mysterious as the St. Lucian Black Finch (*Melanospiza richardsoni*), representative of a monotypic genus known only from St. Lucia, the largest of the "Windward Islands" of the British West Indies. The many collectors who have visited St. Lucia have so habitually overlooked this interesting Finch, that it began to be doubted if it really had been collected on St. Lucia. The writer himself spent six weeks on the island in 1927 and three more weeks during the present year before finally locating it.

Until the present year, apparently only two specimens, both males, had ever been collected. The bird was described by Cory in 1886, from a specimen purchased by Mr. W. E. Richardson together with the skins of many other St. Lucian birds, from a native living in the interior of the island, who declared that the bird was found "in the mountains." Mr. Richardson himself claimed to have seen the Finch in life but unfortunately was unable to obtain further specimens, since during his visit to the island all shooting was prohibited by the authorities. The second specimen was collected together with a few other St. Lucian birds in December 1888, when the U. S. Fisheries' steamer "Albatross" visited the island.

Then, in May 1929, while collecting in the interests of the Academy of Natural Sciences of Philadelphia, I rediscovered *Melanospiza* and secured specimens of both sexes.

The St. Lucian Black Finch was first described by Cory as *Loxigilla richardsoni*, and then transferred to the Galapagoan genus *Geospiza* to which the male bears a remarkable, though superficial, resemblance. It was later placed among the Grassquits, *Tiaris*, and was finally elevated to the rank of a monotypic genus, *Melanospiza*, the relatively much larger bill being the principal character separating the bird from the Grassquits.

Though structurally close to *Tiaris* the bird in life acts in a man-

ner very different from that of a Grassquit and resembles both in appearance and in habits the "Grosbeaks" (an absurd name at least for the Lesser Antillean birds) of the genus *Loxigilla*. This resemblance is indeed remarkable and the confusion of the two birds is no doubt the reason why *Melanospiza* has for so long remained little known.

It is interesting to note, for the sake of comparison, that on the islands of St. Vincent and Grenada, two Flycatchers *Elaenia martinica* and *Elaenia flavogaster* occur practically side by side and when seen as skins can only with some difficulty be distinguished, yet when observed in the field they appear so distinct as to be recognizable at a glance. On the other hand *Melanospiza richardsoni* and *Loxigilla noctis*, so different when seen in the hand, can with difficulty be distinguished in the field. *Loxigilla noctis* has a smaller bill, black instead of pink legs, and a less robust appearance than *Melanospiza*, while the plumage of the male is more glossy and of course the throat is chestnut-rufous, not black, while the gray head of the female *Melanospiza*, at times, shows up in sharp contrast with the brownish upper parts. Moreover the flight of *Loxigilla* is more undulating, less direct, than that of *Melanospiza*, the flight of the latter being more like that of its relatives the Grassquits. But all these differences I would regard as purely secondary field characters, which can only be noted under favorable circumstances. It should be of value, therefore, to ornithologists visiting St. Lucia in the future, to state the primary characters by which these two birds may be distinguished in the field.

a. *Song.* The song of *Melanospiza* is utterly different from that of *Loxigilla*. When heard from a distance it might be mistaken for an aberrant song of a *Coereba* but is really unlike that of any other St. Lucian bird. My field notes describe the song as "*Tick-zwee-swisiwis-you*" the accent on the second and last notes. The first note resembles the introductory note of the song of *Tiaris bicolor* which to my ear resembles a harsh emphatic "*tick-zweee.*" The second note of the song of *Melanospiza* has a curious buzzing quality, reminding me of the song of the Blue-winged Warbler (*Vermivora pinus*). The last part of the song is shriller. There is little variation.

The birds are apparently in song only during the breeding season, i. e., the late Spring and Summer months.

b. *Twitching of the tail.* Except for its song the habit of constantly twitching its tail *independently* of any other movement of its body is the best field character distinguishing *Melanospiza* from *Loxigilla.* Moreover though the tails of the two birds are of about equal length, that of *Melanospiza* is relatively shorter and appears decidedly so in life.

Both birds are remarkably tame and both may be found feeding on the fruits or berries of trees at some distance from the ground. Both species are, however, largely terrestrial in habits.

Though far from common, *Melanospiza* is widely distributed on St. Lucia and is found from sea level, Anse le Raye, to at least 1500 feet in the mountains. Its favorite haunts are the dense second growth thickets about the borders of the virgin forest, though in the wild unsettled country about Anse le Raye, a locality where the St. Lucian Whip-poor-will (*Antrostomus rufus otiosus*) and the Fer de Lance (*Craspedocephalus lanceolatus*) still occur in some numbers, I found *Melanospiza* frequenting the thick arid scrub country at sea level.

Though most of my specimens of *Melanospiza richardsoni* were collected in the mountains of northern St. Lucia in the neighborhood of the Piton Flore, the bird was unknown to the native hunters in that section. In the southern mountains, in the vicinity of the Piton Canaries and in the hills behind Micoud, the bird seems to be well known to the natives under the name of "Moisson Pied Blanc." In this part of the island the natives assert that it is found only in the mountains at high elevations and I believe they are correct.

Previous to my rediscovery of this bird, it was my belief that the St. Lucian Black Finch was an ancient form slowly dying out under present conditions, but it now seems that it is well established on St. Lucia and far from becoming rarer should increase in numbers with the opening up of the country. Moreover, it seems to the writer quite possible that it, or some allied form, may be found on certain other of the Lesser Antilles, Martinique and Barbuda being the most likely.

Altogether seven specimens of this rare finch were collected, including four males and two females, the first being taken on May 18, and the last on May 31. I was unable to determine the sex

of one specimen which is probably an immature male. The testes of three of the males were much enlarged indicating proximity of the nesting season.

A description of the birds follows:

Adult Male: Uniform deep black, including under wing coverts, without gloss. Legs and feet in life pale pink, in skins buffish brown, iris hazel, bill black.

Measurements: (Four specimens) Wing 60.9–70.9 (72.75), Tail 48.3–48.5 (48.43), Exposed culmen 13.7–14 (13.87), Tarsus 20.6–21.8 (21.).

Adult Female: Crown feathers dark mouse gray, margined with brownish olive. Sides of head chaetura-drab. Back and interscapular region sepia brown shading to Dresden brown on rump and upper tail coverts. Rectrices bister. Primaries dark sooty brown, outer webs edged with tawny olive. Wing coverts and secondaries sepia brown. Under wing coverts white slightly tinged with buffish. Throat and underparts light mouse gray, the feathers margined with ochraceous tawny. Abdomen a clear light buff, sides, flanks, and undertail coverts ochraceous tawny.

Measurements: (2 specimens) Wing 65.1–65.65. Tail 45.75–46.65. Exposed culmen 13.8–14. Tarsus 20.1–20.2 mm.

Immature Male? Resembles ♀ but upper parts darker, nearer umber brown, upper tail coverts more rusty and rectrices more rufescent, scapulars and outer web of secondaries widely margined with a rich rusty brown. Chin and throat mouse gray margined with buffish brown. Rest of underparts pinkish buff, darker, more honey yellow, on the sides. Bill horn color.

Measurements: Wing 64.; Tail 44.5; Tarsus 20.5; Exposed culmen 13.1 mm.

Academy of Natural Sciences,
Philadelphia.

GENERAL NOTES.

Observations of the Horned Grebe in Captivity.—On April 8, 1929, a Horned Grebe (*Colymbus auritus*), was brought in to the Buffalo Museum of Science by a boy who reported having found it near his house in one of the city streets. The bird was immediately put in one of our 500 gallon glass aquarium tanks for observation. It seemed to feel at home immediately and began swimming about and occasionally thrusting its head under water and peering about in search of food. I put a few minnows in the water and the Grebe at once began diving for them. At first the bird was confused by the glass while swimming under water, but quickly became accustomed to it and after bumping into the side of the tank quite hard several times, it learned to avoid the peculiar substance and to swerve quickly just before striking it.

After it had gone under water several times it was apparent that its plumage was in poor condition. Instead of shedding the water in the way they should do, the feathers became soaked and plastered down close to the body. I realized that this was an unhealthy condition, especially as the water was rather cold, so I put a wooden raft in the tank. The bird immediately availed itself of this, jumping clear out of water with a single, simultaneous stroke of both feet and landing on the float. It then began to preen its plumage vigorously, running the soaked feathers through its beak to squeeze the water out of them and then shaking off the drops with a quick flirt of the head.

For the first week the Grebe spent the greater part of the time on the raft either preening its plumage or sleeping, going into the water only to feed and then coming right out again. At the end of a week its plumage was in good condition and did not become soaked even when the bird went under water many times. As a result the raft was abandoned almost entirely and the Grebe floated or swam about the tank or slept with its head resting along its back, its bill pointing towards its tail.

The little fellow soon learned that when I approached it generally meant a fish or two for him, so he would come to the side of the tank, swim rapidy back and forth, and thrust his head repeatedly under water to catch a glimpse of the food. His fearlessness, for a wild bird which had been in captivity such a short time, was astonishing. I had an excellent opportunity to observe his manner of diving and feeding. As soon as the fish was sighted the bird would go after it, but the manner of diving was not like that of wild birds that I have seen in the open bodies of water. This Grebe did not leap forward and downward in a sort of arc nor did it sink straight down feet first. It simply stretched its neck straight out toward the fish and swam in that direction propelled by rapid alternate strokes of its feet. There was no sudden plunge, it was merely a continuation of the surface swimming, only the course was changed to either straight down or obliquely downwards, depending on the location of the prey.

While swimming under water the feet were always used alternately as in swimming on the surface. They were, however, held farther out to the side while the bird was under the surface than while on top, when the stroke was more nearly under the body. When the fish was approached, the head was drawn slightly back and then darted out suddenly. If the fish eluded the thrust, it was followed by other thrusts in quick succession even before the feet had had a chance to change the direction of the body. If the prey escaped all of these, the Grebe swam rapidly in pursuit until near enough to repeat the volley of lightning-like thrusts. It did not take many of these sallies before even the swiftest shiner was caught. If the fish was a small minnow and was captured at the first rush, it was generally swallowed under water and the Grebe continued his dash after another. If however, the fish was as much as three inches long, or the bird had become wearied by a long pursuit, it would come to the surface to swallow its prey. The fish was generally caught either across the middle or near the end of the tail. The procedure of swallowing was always the same. The fish was maneuvered about by quick opening and closing of the beak until its head pointed down the bird's throat and was then swallowed, aided often, if the prey were large, by strenuous gulping. The Grebe was able to swallow shiners (*Notropis cornutus*) up to four inches or suckers (*Catostomus commersonii*) up to four and three-eighths inches. After vainly trying to swallow a trout perch (*Percopsis guttatus*) four and one-half inches long, and finally having to let it go, the bird did not attempt to catch this same fish again although it swam about in the tank for the rest of the day. I generally fed the Grebe five or six minnows, two or three inches long, twice a day. This seemed to be all the food it desired. Often it would attempt to catch the fish when they were near the surface without diving by merely thrusting its head down. This method was employed more frequently as time went on and one of the bird's legs began to stiffen up at the joint. Eventually all use of this member was lost, which greatly handicapped the bird in its diving and it avoided going under as much as possible. However it could do so if necessary and did it very frequently, stroking vigorously with its one good leg. The cause of the stiffness was unknown, but was assumed to be the result of an injury sustained when the bird landed in the street. At no time did the Grebe vary its method of diving from that previously described, even after losing the use of its leg, and at no time was it ever seen to use its wings in any manner whatsoever while swimming under water. This checks with what Dr. Charles W. Townsend has to say in his paper "The use of wings and feet by Diving Birds" (Auk—July 1909, Vol. XXVI).

The Grebe had considerable difficulty in getting under water when it had the use of only one leg and the manner of swimming was very jerky, also it was unable to change its course as rapidly as formerly. Because of these difficulties I let most of the water out of the tank so that the bird could easily reach the bottom when its neck was stretched out to its

fullest extent and the fish were caught with little difficulty without diving. At this stage I tried feeding cut up pieces of larger fish as my supply of small fish was not inexhaustible. This, however, proved unsuccessful. The cut fish was apparently not recognized as food.

The Grebe continued in apparent good heatlh with the exception of its lame leg up until May 4, when I noticed that its plumage had suddenly lost its ability to shed water. The bird again looked like a drowned rat as it had when first put into the tank. This time however, it did not avail itself of the raft. Although it continued to eat well that day, on the next morning it was found floating on the water dead.—JOHN W. ALDRICH, *Buffalo Museum of Science.*

Red-throated Loon in Northern Illinois.—The Red-throated Loon (*Gavia stellata*) appears to be a casual visitor within the state of Illinois. Nelson recorded the bird as a common winter visitor on Lake Michigan in 1876, yet, at present, there are few skins of this bird obtained within the state. I have been able to discover only three occasions on which specimens have been taken, namely: February 15, 1870, three birds; February 13, 1885 and April 18, 1908.

During a snowstorm on April 14, 1928, I was collecting along the lake at Beach, Lake County and was surprised to discover a Loon of this species in the canal which empties into Lake Michigan. The bird, a male in winter plumage, was collected.—JAMES STEVENSON, *Los Angeles, California.*

Auk Flights at Sea.—While I was crossing from England to America last winter on the Leviathan, flights of Auks were observed on two successive days and it may be of interest to put them on record. On February 25, I came on deck at 8:40 in the morning and walking forward to starboard saw two small flocks of Razor-billed Auks (*Alca torda*) cross the bow and, flying in more or less the direction of the ship's course, they slowly moved away on the starboard beam. Crossing to port, I saw at once that a general movement of some sort was in progress and this continued for more than half an hour. There is no way to tell how long it had been under way when first noticed.

Birds—all of them Razor-bills—were passing continuously, flying steadily close to the sea, and all in the same direction. They were mostly in flocks of from ten to sixty individuals which had a definitely typical arrangement with about one-third of the birds closely grouped in front and the rest following more and more widely separated until a straggler or two brought up the rear, but there were also twos and threes and at times large areas over which irregularly scattered individuals were moving. Occasionally larger flocks were formed but these soon divided to make two or more of the usual smaller ones for which an average of thirty birds might be fairly accurate. The flocks, however, had little permanence as such and seemed only temporary points of concentration in the moving mass.

Any estimate of total numbers is impossible as the beginning of the flight was not observed, but after counting the birds in a few of the smaller flocks it was possible at a glance to estimate the size of others with fair accuracy and thus gain an idea of the number of birds in sight at one time. By this method the highest count, without using field glasses, was 380 and the lowest 100. With glasses other flocks further away were visible but there was a definite width of front to the movement, for beyond a fixed distance at which the moving groups could still be clearly seen there were no more birds. In all, between 8:40 and 9:15 in the morning, 3,000 individuals at the very least must have passed the ship.

The change to summer plumage was taking place at the time. Many birds showed light, though hardly white, on the sides of the head. Others had the full black hood of the breeding plumage and large numbers fell between these two extremes.

Calculating as well as I can from the ship's announced positions at noon each day, the observation began at 42° 58′ N., 49° 56′ W. and ended at 42° 57′ N., 50° 14′ W., or just at the southern end of the Great Bank of Newfoundland where it narrows to a point known as the Tail of the Bank, about 245 miles southeast-by-south of Cape Race.

The birds overtook the ship from the port quarter and crossed the bow to starboard. It is difficult to form any accurate idea as to the direction of the movement. The ship's course was 267°,[1] that is 3° south of West, at the time and the direction of flight made an angle of between 20° and 30° with the course. The birds would be flying then between 287° and 297°, that is between 17° and 27° north of west, or in the general direction of Cape Breton Island. This angle between the direction of the birds' flight and the ship's course was estimated only from memory and several weeks after the event so that too much reliance can not be placed in its accuracy. In the notes written at the time the direction of flight is put down as "something like WNW." Expressed in degrees this is 292° 30′ which agrees with the estimate above. This notation was made hurriedly in the field, however, without thought of angles, or other effort to secure accuracy. In fact the ship's course was noted as "perhaps SW by W," an error of over 30°, so this guess at the direction taken by the birds must also be accepted with caution. Still I believe one is justified in stating that the birds were flying in the general direction of Cabot Strait and the adjacent coasts forming the southern entrance to the Gulf of Saint Lawrence, 500 miles away northwest-by-west.

The speed at which the birds were flying seemed perhaps one and a quarter to one and a half times that of the ship. They came from astern and passed on ahead regularly and without signs of particular effort. The weather had undergone no marked change since the preceding day

[1] A ship's course is designated by the angle which it makes with true North. This angle can be anything from 0° to 360° and is measured from North through East, South and West back to North. East is thus 90°, South 180°, Southwest 225°, West 270°, and so on.

so the average speed of the ship from noon to noon, 22.84 knots, may be taken as accurate enough for this calculation. On these assumptions the birds were flying between 28.5 and 34 miles an hour, these figures referring of course to nautical miles of 6,080 feet. There was a fresh southwest wind blowing at the time so the birds' speed through the air was greater than the figures given, probably more like 40 miles an hour.

The next day, February 26, soon after noon and not far from 41° 13′ N., 65° 20′ W. (137 miles south of Cape Sable), there took place a flight of Dovekies (*Alle alle*), but on a much smaller scale than that of the Razorbills on the previous day. First came a flock of fifteen flying almost parallel to the ship's course and 200 yards to port; then eight or ten more flocks and many scattered individuals, perhaps 200 birds in all, flying steadily in one direction. At least one flock managed to cross the ship's bow but others turned away to port. The speed of the birds was little if any faster than that of the ship; a fresh northwest wind must have hindered them somewhat. There were never more than four or five flocks in sight at one time and the last had disappeared within ten minutes after the first was noticed.

During the passage of these Dovekies a certain number of others were flushed from the water by the approaching steamer and they thereupon joined those in flight. This would seem to indicate that large flocks, such as that of the Razorbills described above, may be built up from birds widely scattered in small parties who have successively joined the flight as it passed. In neither of the two cases observed was any withdrawal noticed; in fact the most striking characteristic of both flights, but specially with the Razorbills, was the regular succession of flocks moving steadily in one direction which seemed to express a fixed purpose in every bird to reach with all speed some particular spot off beyond the northwestern horizon.

The question naturally presents itself whether such flights are migratory movements toward shore for the breeding season. In the case of the Razor-billed Auks there might be some ground for this inference, as the direction of their flight was toward a part of the coast where the species nests regularly. In the books of reference at hand nothing is said as to when birds which have wintered at sea arrive off the coast or in the vicinity of their breeding places. Coward,[1] writing of British birds, states, "Early in March or even in February the birds return to the neighborhood of the nesting colony, ..." If this occurs at the same time on the American coast, the birds observed could well have been definitely on their way toward their nesting places. On the other hand Lowe[2] refers to "the tendency of the whole Auk tribe to hang together in huge flocks—nomadic flocks, which wander all the winter upon the face of the limitless expanse of the ocean, . . ." Further information is needed to judge whether these Razorbills were migrating or merely wandering.

[1] Coward, T. A. The Birds of the British Isles and Their Eggs, Series II, p. 264.
[2] Lowe, P. R. Our Common Sea Birds, p. 249.

The line of flight followed by the Dovekies was not clearly evident as the ship caused many of them to turn aside. In any case they were moving to the west toward the coast of the United States, not in the direction of their breeding grounds in the far North.—THOMAS H. MCKITTRICK, JR., *28 Chelsea Park Gardens, London S. W. 3, England.*

Little Gull at Point Pleasant, N. J.[1]—On the afternoon of August 11, 1929, in company with Messrs. Richard Herbert, C. A. Urner and L. L. Walsh, I found a large flock of Common Terns on the sand along the Manasquan River at Point Pleasant, N. J.

We noticed that one bird lacked the black on the head and when the flock suddenly arose and circled a few times before settling again, this bird was seen to have black under wing surfaces. We immediately surmized that it was a Little Gull (*Larus minutus*) having learned this character when the Little Gull appeared at Newark Bay in May of this year (see 'Auk,' July 1929, p. 376). We approached as near as we could and observed the bird closely as it stood on the sand. It was smaller than the Terns with a different build, resembling a Bonaparte's Gull. The under parts of the body were white. The head was white with gray spots, presenting a mottled appearance. The bill which was very small, appeared black and the eyes also were apparently black. The feet were very dark and to some of us appeared to have a reddish tinge. As the bird flew the wings were seen to be pale gray above with no white except for a distinct white margin on the posterior edge, which showed both above and below. The rest of the under surface appeared black and, contrasted with the white parts of the body, made a striking field mark.

As we approached nearer the Terns grew nervous and finally took wing leaving the Gull alone. We continued to approach and were within seventy-five feet of it when it arose and flew to another point.—JAMES L. EDWARDS, *27 Stanford Place, Montclair, N. J.*

Golden-eye Nesting on the Ground.—In 'The Auk' for October, 1928, p. 498, I recorded finding the nest of a Golden-eye Duck on the ground under an old tree top. Correspondence on this matter with Mr. J. Hooper Bowles led to some doubt as to whether the nest really was that of a Golden-eye. When I visited the spot in June last I succeeded in finding some of the fragments of the egg shells which I sent to Mr. Bowles. The high water of the spring freshet had evidently covered the nesting place and how much change it had wrought on the egg shells I do not know.

Mr. Bowles writes me as follows: "I took the eggshells down to our museum where my collection is kept and compared them carefully with the eggs of every species to which they might possibly belong. They compare perfectly with eggs of the Red-breasted Merganser, being only slightly less buffy, which might easily be caused by exposure to the elements. They do not have the gloss of the Harlequin, which I doubt if exposure

[1] Published by the Dwight Memorial Fund.

could entirely remove; neither do they have even a trace of the greenish blue of the Golden-eye, which I doubt greatly if exposure could remove.

"Generally speaking there is a striking similarity in the upper parts of the females of the Red-breasted Merganser and the Golden-eye, including the white wing patch. The beaks of course, are utterly different, so, if you had a good look at the beak, this theory is completely knocked in the head. Now, as I have said, I feel as though I were insulting an experienced duck hunter, like yourself, by suggesting that he might mistake a female Golden-eye for something else. However, I am treating you exactly as I would cross examine myself. If I did not get a good look at the beak and a clear impression of the bird as it left the nest—well, the mistake would have been possible."

I rather think Mr. Bowles has the best of it. Had his suggestion come up last year, when it was all fresh in my mind, it might not have made as much of an impression of doubt as it does now after a lapse of time. The place was so dark that I did not distinctly see the Duck on the eggs, and so thick that I did not crawl in to examine the eggs as I should have done, but the occurrence was so unusual that I am going to give Mr. Bowles the benefit of the doubt and make this acknowledgement so that a possible error may not be carried into the future as a fact.—Wm. B. Mershon, *Saginaw, Mich.*

Breeding of the Pink-footed Goose in Iceland.—American Ornithologists, particularly those primarily interested in oölogy, may be glad to hear that the vexed question as to whether the Pink-footed Goose (*Anser brachyrynchus* Baillon) does or does not breed in Iceland has at last been definitely answered by Mr. S. W. P. Freme, M. B. O. U. and myself, as one of the results of six weeks ornithological work in Iceland during the summer of 1929.

As we intend to shortly have a paper published in 'The Ibis' giving the results of our experiences I am unable to give readers of 'The Auk' full particulars as to our find, beyond stating that we were led to a very flourishing nesting colony of these Geese in the north central desert. Our guide insisted that he was leading us to a breeding colony of the White-fronted Geese (*Anser albifrons* Scopoli). Identification of the Geese presented no sort of difficulty, but for the education of the guide and for exhibition purposes my companion shot a Goose from the first nest we came to in the colony.

Nests seen contained from five to seven eggs but numbers had been harried by foxes and possibly by Ravens (*Corvus corax tibetanus*) as well. Many nests were inaccessible in the limited time at our disposal as they were mainly situated on the precipitous sides of a wonderful river gorge, many miles from our base. The question has now arisen, as a result of our discovery "Does the White-fronted Goose breed in Iceland? If so what race?" I know it is *supposed* to do so and many eggs purporting to be of this species have been sent from Iceland by native collectors. We propose

to discuss this question in the forthcoming 'Ibis' article.—W. M. Congreve, Major, M. B. O. U. etc., *Hafod, Trefnant, Denbighshire, North Wales.*

Caspian Terns (Sterna caspia imperator) at Palmyra, N. J.—On April 21, 1929, in company with W. C. Doak, E. G. Loomis and W. J. Emlen I paid a short visit to the open marshes along the Delaware just south of Palmyra, N. J. A slow steady rain was falling, and consequently very few birds were about. However, near the ferry dock we noticed among a small flock of Herring Gulls three birds whose whiter plumage and more graceful flight made them quite distinct. A look through the glasses revealed the typical black cap of the Terns and a short but decidedly forked tail. One of them flew up to within reasonably short range, giving us a chance to see his large red bill and short forked tail, which, aside from the size, are the principal field marks of the Caspian Tern (*Sterna caspia imperator*). All three of them flew around for some time and finally lit on a distant mud flat, where they remained partially hidden by grass.

Spring records for this bird are quite rare, and we have been unable to find any for this section.—J. T. Emlen, Jr., *Philadelphia, Pa.*

Ducks and Other Water Birds on the Reading, Pa., Reservoir.—During the past year the city of Reading completed an impounding dam, about seven miles from the city limits, which has created an S-shaped artificial lake some two miles in length and averaging in width about 220 yards, with a maximum width of 400 yards.

This is the only body of still water of like size in the neighborhood with the exception of the Schuylkill River, which has become choked with culm from the coal regions, and is now absolutely barren of any vegetation or fish-life.

This spring was the first season that the dam has been filled and it has proved remarkably attractive to passing water-fowl throughout the entire season. Nearly all the trees in the neighborhood have been cut down, leaving a broad expanse of gently undulating upland meadow on all sides. Perhaps this latter feature of the landscape has had something to do with the immediate acceptance of the dam by passing water-birds, which normally occur here in very small numbers, and only for a short period following storms.

It is of course too early to draw any conclusions, but if the past season is typical of what is to be expected in the future, the writer is led to believe that this locality is in the path of a much more extensive overland migration of water-birds than has heretofore been suspected. A glance at the map will show that Reading is located in the path of the shortest flight between Delaware Bay, and the New York lake region, as well as Lake Ontario.

Practically every rain or spell of "heavy" weather, especially at night, has caused a number of these transients to alight for a greater or lesser

period. Many of them left within a few hours, but some evidently found conditions to their liking and remained for several days or even weeks. It was immediately after a night of warm rain, however, that the heaviest flights were always noticed, and the writer visited the spot each morning after such a storm and before the birds had been disturbed.

The long narrow form of the dam made it an easy matter, as a rule, to stalk the groups that dotted the dam within reasonable identifying distance with the aid of high-powered binoculars, and it was fortunately possible to identify practically all of those seen with certainty, a thing not always possible on larger bodies of water.

Upon my first visit in March 31, 1929, I was told that Ducks had already been there for several weeks, or since the ice broke. At that time there were about 100 birds on the dam, including Pied-billed Grebes (2), American Mergansers (13), Hooded Mergansers (8), Mallards (4), Black Ducks (80), (a number of hybrids, Black × Mallard, could be distinguished in this flock), Pintails (1), Baldpates (4), and Greater Scaups (5).

I also had the thrill during this visit of seeing a Duck Hawk swoop down from nowhere, and turning almost on its back, make an unsuccessful grab at a Black Duck that fairly fell into the water in his flight, while the whole concourse of Ducks remained huddled in terror until the Hawk had passed out of sight.

On April 2, four Blue-winged Teal, one Green-winged Teal, four Golden-eyes, and one Canada Goose were there, in addition to most of the others previously seen. The latter had, however, thinned out to some extent.

On April 7, the first Greater Yellow-legs appeared, and on the 13th a flock of twenty Bonaparte's and one Herring Gull were flying about the lake, while there were Golden-eyes (25), Buffle-heads (12), Lesser Scaups (12), and Old Squaws (60) scattered over its surface, as well as a goodly sprinkling of the other species.

A Loon arrived on April 14, and on the 21st, after a warm southerly rain, the largest flight of the season occurred, with about 400 individuals, including a Double-crested Cormorant, 250 Horned Grebes, 45 Red-breasted Mergansers, and four Ruddy Ducks.

The next storm, on April 23, was accompanied by a strong northwest wind, and a pair of Gadwalls, two Shovellers, and six Green-winged Teal were identified among the assemblage.

A similar storm with strong northwest wind on May 3 brought a Caspian Tern, three Black Terns, and a pair of Coots. By this time most of the Ducks had passed on, a comparatively small number of stragglers remaining.

On May 5 a large flight of Yellow-legs occurred, in which the Lesser Yellow-legs far outnumbered the larger species. They were observed together, while a number of Solitary Sandpipers were mingled with them, so that identification was certain. The proportions of these species were, Greater Yellow-legs (5), Lesser Yellow-legs (70), Solitary Sandpipers (30).

A pair of Least Sandpipers was also noted. The Yellow-legs remained in nearly the same proportions for two days.

May 7 brought a pair of Ring-billed Gulls, and five Bonaparte's; a pair of Black Terns, which may have been those of the third, was also noticed.

A Mute Swan and a Little Blue Heron in pied plumage were the surprises of May 12, while a few of the Ducks and one each of the Horned and Pied-billed Grebes remained. At this time the water commenced to lower, and by the following visit, on May 26, a considerable area of mud flat was exposed, which was tenanted by a pair of Black-bellied Plover, twelve Semipalmated Plover, and several Least and Semipalmated Sandpipers, all of which remained until May 30, when the Black-bellied was last seen, although the other species remained until June 2, and a small flock of Semipalmated Sandpipers was still about on the 6th.—EARL L. POOLE, *Public Museum, Reading, Pa.*

Egret at Wareham, Mass.—On July 30, 1929, I noticed two large birds coming from the southward over Buzzards Bay, as they came nearer I recognized a Great Blue Heron followed by an Egret. The pure white plumage and black legs of the latter together with its slender body, "willowy flight" and my familiarity with the bird in Florida, Georgia, and South Carolina made the identification as certain as possible without taking the bird's life, which was not thinkable.

This is my second record of the Egret in this locality; the first was made some fifteen years ago.

The Blue Heron was leading as they crossed the beach and, was first to alight on the marsh back of it; the Egret lit close to the larger bird, and, evidently regarded it as a companion.—WALTER B. SAVARY, *Wareham, Mass.*

Egret at Pocono Lake, Pa.—Two American Egrets (*Casmerodius egretta*) have been present on Pocono Lake, Monroe County, Pa. since August 1 and are still here at present writing, August 11. Their black legs and yellow bills can be distinctly seen as they allow an approach within fifty yards or less. Egrets were reported here in the summer of 1916 by Mr. John D. Carter and photographs taken of them but I am not aware of any having been seen since.—HENRY R. CAREY, *Pocono Lake Preserve, Pa.*

Snowy Egret (Egretta candidissima candidissima) in Northern New Jersey.—Daylight on August 5, 1929, found me in a tract of fresh-water swamp known as Troy Meadows near Ridgewood, N. J. I had succeeded in crawling to within 15 feet of the edge of a pool in which several species of Herons were feeding. The actions of one small, white Heron in particular attracted my attention. Instead of searching for its prey in the manner of Little Blue Herons, it seemed to deliberately roil the water with raking foot motions and then seize the food that had

been disturbed from the bottom. As the light became stronger I noticed the bill was black except for a small yellow area at the base of the upper mandible. The bird was noticeably smaller than the immature Little Blue Herons in its company and when a blundering cow had put the Herons to flight I detected yellow toes against a background of dark legs. Unmistakably this was a Snowy Egret.

Again on August 7, in company with Mr. Charles A. Urner, I visited the pool. This time we discovered two Snowy Egrets feeding with ninety immature Little Blue Herons and twenty-five Egrets. It soon became possible to pick out the birds without the aid of glasses simply by observing their peculiar feeding habits.

The Heron count on August 5 was estimated to be 700, divided as follows: Bittern 25, Great Blue Heron 50, Egret 20, Snowy Egret 1, Little Blue Heron 75, Green Heron 200, Black-crowned Night Heron 350, Yellow-crowned Night Heron 1. Investigation would seem to indicate that this record for the Snowy Egret is the second for the state, in recent years.—Lester L. Walsh, *Ridgewood, N. J.*

A White Heron Roost at Cape May, N. J.—Little Blue Herons (*Florida caerulea*) and a lesser number of Egrets (*Casmerodius egretta*) are regularly present on the salt meadows and inland ponds of Cape May County, N. J., during the latter part of July until late September, their numbers varying from year to year, thirty being probably the greatest number recorded in sight at any one time. Neither species is known to nest in the state although the former, and perhaps the latter also, bred in Cape May County until about 1880.

On July 27, 1929, about sunset, I saw, from an automobile, a large number of white herons apparently settling upon some low woods bordering the marshes some distance from the shore road upon which I was travelling, and a few miles north of Cape May. Subsequent investigation by Mr. H. Walker Hand and myself disclosed a regular roosting place, and by locating in an open field near the spot, from about 6.45 to 7.15 P. M. (DST), the birds could be seen to advantage coming in to spend the night. They all came from the north except for a few that flew in from the meadows directly east, and came as straggling individuals and in flocks of six, twelve, twenty or even more. From their numbers they must have included birds from far to the northward, possibly from most of the New Jersey coast district.

An accurate count made on August 31, by Mr. E. S. Weyl, who accompanied me on this occasion, showed 25 Egrets, 400 Little Blue Herons in white plumage and 124 in adult blue plumage, including some pie-bald or mottled individuals, making a total of 549 for the evening and other counts were approximately the same. It was an impressive sight, especially for a locality so far north.—Witmer Stone, *Academy of Natural Sciences, Philadelphia.*

Yellow-crowned Night Heron (Nyctanassa violacea) in Morris County, N. J.—An adult of this species in full plumage, was found on

June 16, 1929, associating with Black-crowned Night Herons (*Nycticorax n. naevius*) in the Troy Meadow swamp, and on August 5 I saw another in immature plumage. In both instances it was possible to approach the birds very closely. In this connection it is interesting to mention that several authors have commented on the impossibility of satisfactory field identification of immature birds of these two species. It is my experience, however, that either awing or at rest there are sufficient differences to enable one to make reasonably long range identification with certainty.—Lester Lewis Walsh, *11 Walthery Avenue, Ridgewood, N. J.*

Yellow-crowned Night Heron in New Hampshire.—On August 13, 1929, I started up a Yellow-crowned Night Heron (*Nyctanassa violacea*), in a salt marsh in Portsmouth, N. H. The plumage was intermediate between that of young and adult. I am certain that it was not a Black-crowned Night Heron because it looked strikingly different with its more slender neck and its manner of moving and holding itself. It alighted, and I was able to watch it with glasses close at hand, and to compare it with two Black-crowned Night Herons which joined it, and the comparison left no doubt about its identity.—John T. Coolidge, Jr., *Readville, Mass.*

Some Shorebird Records for Northern Illinois.—At the north end of Lincoln Park, Chicago, is an area of filled in land and flats that has become an excellent stopping place for migrating shorebirds. Many rare or uncommon species of waders have been discovered in this section of the park. I submit a supplementary list of a few records.

Micropalama himantopus. Stilt sandpiper.—A crippled bird in fall plumage was captured by a friend and myself on the lake shore August 31, 1925. This species is certainly uncommon in the Chicago area.

Limosa haemastica. Hudsonian Godwit.—A bird of this species, discovered on September 25, 1924, spent some days feeding on the flats. The individual was quite tame and allowed a very close approach. The species is seldom met with in these days in Illinois. There are few records for occurrence during the last fifteen years.

Numenius hudsonicus. Hudsonian Curlew.—Curlew are becoming more common in the area these years and are recorded almost every year by at least one observer. A pair paid a visit to the park on October 18, 1923.—James Stevenson, *Los Angeles, California.*

Wilson's Plover on Cape Cod.—On June 26, 1929, while banding Terns on the Pamet River rookery in Truro, Mass., I observed on the beach a Wilson's Plover (*Pagolla wilsonia wilsonia*). I collected the bird and found it an adult male with enlarged testes, in rather worn plumage. The specimen, which is now in the Museum of Comparative Zoology, is the third to be taken in the state.—Oliver L. Austin, Jr., *Cambridge, Mass.*

Wilson's Phalarope in Maryland.—On May 12, 1929, in company with Mr. F. C. Lincoln, I found an adult female Wilson's Phalarope

(*Steganopus tricolor*) about three miles northwest of Dickerson, Maryland, not far from the southern base of Sugarloaf Mountain, on some artificial ponds constructed for the commercial rearing of goldfish. The bird was in company with a little band of Lesser Yellow-legs, and fed constantly beside them, alternately walking where the water was shallow and swimming where the longer legs of its companions carried it into water beyond its depth. The Phalarope was in full breeding plumage and as I had it under easy observation for nearly an hour there is no possibility of error in identification. Because of the nature of the ground and the wariness of the Yellow-legs I was not able to approach near enough to secure it with the thirty-two pistol which constituted the only collecting gun I had with me.

So far as I am aware this is the first report for the state of Maryland.—Alexander Wetmore, *Washington, D. C.*

Wilson's Phalarope Breeding in Michigan.—On June 13, 1929, at Stoney Lake, Mich., I observed a pair of Wilson's Phalaropes, the first I had ever seen. Their presence there at that date seemed indicative of breeding, so I watched them every day or so. As my work was that of Nature Councillor at the Y. M. C. A. camp on Stoney Lake, I had unlimited opportunities to observe the birds and I frequently took groups to see them.

Stoney Lake, a small lake of about two miles in length is situated about eleven miles east of Jackson, Michigan. At the head of the lake, several minutes' walk from camp, is a rather extensive wet meadow overgrown in places with a heavy growth of shrubby cinquefoil. It was in this meadow that on the evening of June 25 I flushed the male bird from a small downy young only recently from the nest. The next morning I mailed the bird to Dr. Norman Wood of Ann Arbor who informed me that the capture of the young bird established the first authentic nesting record for the state of Michigan although the species had been suspected of breeding and reported without definite evidence. In June, 1926, Dr. Wood observed several pairs about Saginaw Bay, but no nests or young were found.

The male bird was last seen on June 30 by Mr. Tinker of Ann Arbor and myself. Since that date we were unable to find either of the pair; the birds apparently had left the lake.—Roger Tory Peterson, *Stoney Lake, Mich.*

Wilson's Phalarope and Baird's Sandpiper in South Carolina.—Mr. Herbert Ravenel Sass in his article "Wilson's Phalarope and Black-necked Stilt in South Carolina" (The Auk, XLVI, p. 383) referred to my observation of a Wilson's Phalarope (*Steganopus tricolor*) on Morris Island in Charleston Harbor, May 5, 1929. In view of the rarity of this species in South Carolina a few more details may be in order.

This Phalarope was feeding with a few White-rumped Sandpipers and

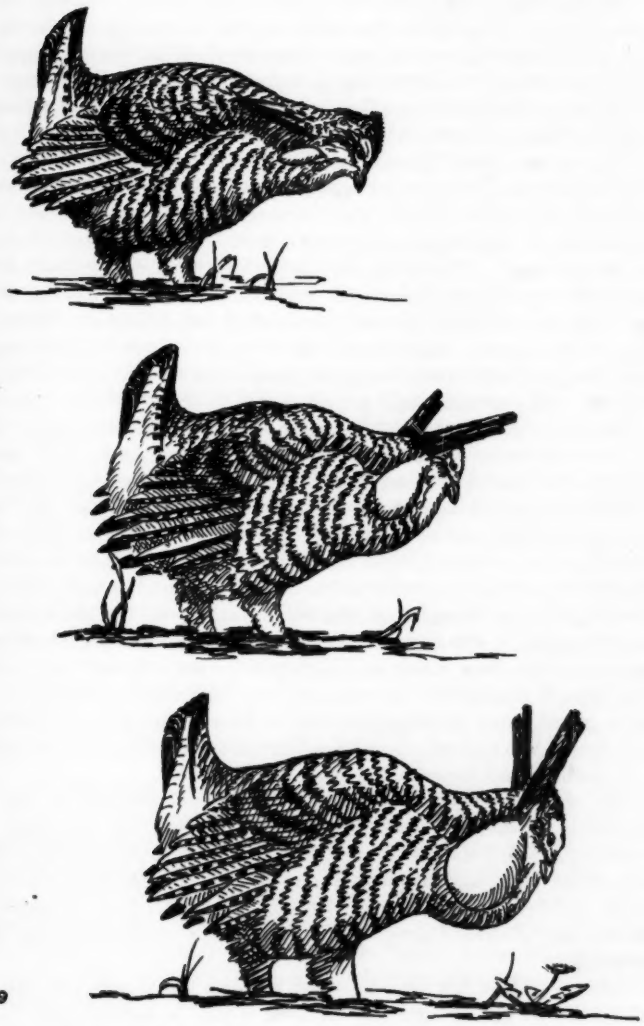
a pair of Dowitchers in a small shallow pool near the north-central end of the island. It was still in the gray plumage with only a slight indication of the stripe down the neck and therefore, considering the date, it must have been a male. The long slender bill and lack of a wing stripe were noted and when compared directly with the White-rumped Sandpipers the Phalarope appeared slightly larger.

Earlier in the morning, while studying the shore-birds feeding on a mud-flat in the Port Terminal Reservation, an army reservation in North Charleston, I identified a single Baird's Sandpiper (*Pisobia bairdi*). This bird was carefully studied for half an hour from a distance of about forty-five feet and direct comparison of size was possible with White-rumped Sandpipers, Semipalmated Sandpiper and Lesser Yellow-legs. The buffiness on the sides and breast was not clear-cut as in the Pectoral Sandpiper but 'faded out' and the general tone above was lighter. I am well acquainted with the Baird's Sandpiper, having seen it frequently in the middle-west and I feel as certain as one can, through sight identification, that this bird was of that species. Since there are no South Carolina records for this bird (see Bent, 1927, Bull. U. S. Nat. Mus., CXLII, p. 201) it should have been collected but as I was inside a military post I hesitated about doing this.

In a letter which I had from Mr. Alexander Sprunt Jr. of Charleston, written May 13, 1929, he says concerning the Baird's Sandpiper "I am sure that I saw one this past winter, that is, as sure as I can be without having taken it—your seeing a Baird's Sandpiper rather corroborates the chance that my bird was one also."—PHILIP A. DU MONT, *Wilton, Connecticut.*

The Booming of the Prairie Chicken.—During the past spring (1929) Prairie Chickens were reported as having taken up their residence in a large, boggy meadow fifteen miles southwest of Minneapolis. The location of their dancing grounds presented excellent opportunities for observation. Two or three small piles of slough grass lay on the ground not far distant and, taking this as a suggestion, a dome-shaped blind was constructed and covered with grass in the center of the dancing area. The birds accepted this immediately and were observed undisturbed during their early morning performances on four different occasions between April 27 and May 3, a total of fifteen hours being spent in the blind observing, sketching, and photographing them. The following is an account of the strange and amusing performances of the birds as they were observed under these very favorable conditions.

A usual morning's performance began about 4:15 A. M. when the birds arrived within a few seconds of each other, alighting directly on their respective "dancing grounds," that is, each bird did most of his displaying within a definite space, perhaps twenty yards across, the birds being about twenty yards apart during the performance. Immediately upon alighting, each set up a henlike cackling in an investigative tone, then the booming



FIGS. 1, 2, AND 3. BOOMING PRAIRIE CHICKEN.

began in fifteen to twenty seconds and was repeated at least every minute during the most active period, usually till about 6:00 A. M.

The booming of the four cocks observed seemed to be almost identical and, except for some slight variations in the movements of the "horns," each individual repeated the performance in about the same manner. The first indication of the boom was a slight spreading and erecting of the tail to a perpendicular position or even pointing slightly forward, and thrusting the head forward with the beak pointing to the ground (Fig. 1). In this position the neck began to swell and the orange pouches to appear. As this took place the feet were well spread and, as though to assure the performer of a solid footing, they were stamped alternately very rapidly and firmly on the ground producing a sound much like that of a distant outboard motor. This could be heard for some thirty yards but the movement could only be seen at very close range. A number of times the cock, claiming the ground on which I sat, chose my hiding place as a more suitable stage from which to throw out his challenge and this stamping movement vigorously shook the whole frame of the blind as he boomed unsuspectingly not six inches above my head. Immediately following this introduction, the sacs continued to swell, the feather "horns" on the neck swung around sidewise a little above a horizontal plane, and the first syllable of the deep-throated boom was produced. The second syllable, with a decided accent at the beginning, came with the "horns" pointing forward and upward (Fig. 2) then, as the last syllable was uttered, the sacs attained their maximum inflation and the "horns" jerked upward almost to a perpendicular position (Fig. 3). The tail, which during the display, was spread with the outer feathers only slightly beyond a parallel position, was flicked a little wider on the accented second syllable and somewhat more widely at the end of the last. It has been suggested that the three-syllabled call seems to say: "Old—Mul—Doon." The call takes about three seconds, the time being equally divided between the syllables. A very loud, deep-voiced humming of the sound of the letter "m" perhaps best suggests the quality of the notes.

The crescent-shaped, orange, skin patch over the eye is concave, as shown by its having a central shadow line parallel with its edges. While booming the bird widens this crescent, projects it noticeably out from the side of the head, and the sunken line disappears, indicating that it is actually inflated. These attain varying developments in different birds. In one they projected above the feathers of the crown while the bird was booming.

Another interesting antic indulged in every few minutes by these birds struck me as quite humerous. A cock would be standing alertly on his grounds, well apart from the others, with no cause for alarm whatsoever, would suddenly fly a few feet straight up in to the air and drop again with a most excited cackling, then continue after alighting a most pathetic, long-drawn out squawking exactly like that of a domestic hen that has been caught by the legs and lifted from her coop.

Occasionally two cocks would eye each other from a distance, then crouching low, would run directly at one another. Sometimes a short encounter with the feet and a flapping of the wings, much like the spurring combats of domestic cocks, took place as they met, but quite as often they stopped when a foot or so apart and crouched on the ground with many a threatening cackle. This might continue for several minutes without any action taking place, then, rising stealthily still eyeing each other suspiciously, they would strut slowly about, booming now and then, until, apparently satisfied that the opponent cared for no more combat, they would go back to their grounds by several short, cackling flights and continue their booming.

When a hen appeared on the scene one morning, the cocks seemed to forget to a great extent the boundaries of their dancing grounds and strutted with added vigor towards the hen. She ran about through the grass, avoiding their advances but circling around within the dancing grounds, until apparently tiring of their shows of vanity, she flew away. During the pursuit the cocks remained some yards apart and succeeded very well in maintaining wonderful poise and dignity without losing their positions near the prospective mate, despite the fact that she frequently chose to run very rapidly away.

Twice during these observations, Marsh Hawks flew low over the little group of Chickens. Once they all ceased booming and crouched low on the ground. The second time two of the birds flew as though a real fear of the Hawk existed. Several times a Short-eared Owl came over even lower than the Hawk. Although it appeared fully as large as that bird, the Chickens did not so much as stop performing during its visits.

Two Crows alighted on their grounds one morning. Immediately one of the cocks rushed at them causing them to move a few yards but not to leave entirely. After that he made no antagonistic moves but strutted about close to them giving no indication of fear.—W. J. Breckenridge, *Museum of Natural History, University of Minnesota, Minneapolis, Minn.*

Domestic Pigeons Nest Hunting on a Mountain Top.—While watching Rock Sparrows on Eagle Mountain in the Wichita National Reserve in southwestern Oklahoma June 5, 1929, I was greatly puzzled as to the identity of a pair of birds flying about the great boulders at the very top of the mountain. When one began the familiar display of the Domestic Pigeon, the problem was solved. The male apparently wished to revert to ancestral habits and nest in the rocks; he would fly into a crevice and stay for ten or more minutes while his mate remained outside; out he would come and bow and coo, but she merely edged further away. Again he went in and came out, then tried anothed spot, continuing his efforts for more than an hour, but she failed to show the slightest interest. Evidently it did not appeal to her to make her home among bare rocks, where her neighbors would be Turkey Vultures and Red-tailed Hawks, wood rats and rattle-snakes.

Eagle Mountain is 1600 feet above sea level and 700 feet above the stream at its base. The Pigeons may have come from the town of Cache five miles to the south.

I left the Wichitas June 6, but Dr. R. D. Bird who stayed another week wrote me that he saw nothing more of these birds.—MARGARET M. NICE, *Columbus, Ohio.*

Zone-tailed Hawk in Lincoln Co., New Mexico.—On April 11, 1929, while watching five or six Turkey Vultures wheeling over the pines, in the Lincoln National Forest on the south side of El Capitan Mountain, I noticed one with a white band across the tail. Upon closer observation I found it to be a Zone-tailed Hawk (*Buteo albonotatus albonotatus*). Its shape and actions in the air were so Vulture-like that had it not been for the conspicuous white band on the tail I should not have noticed its smaller size. I was unable to collect this bird as it was too far away.

I returned two days later and about a mile farther up the canyon was greeted by a loud Buteo call. Just above the tree tops and directly above my car were two Zone-tails circling and screaming. Their note was very like that of the Broad-wing Hawk except that it was much more piercing and not so highly pitched. The bright yellow legs were very conspicuous in flight. Both birds were collected, No. 85973 Coll. Acad. Nat. Sciences Phila. adult ♂ with testes very large. Stomach contained only a few feathers. No. 85974 adult ♀ contained an egg five-eighths of an inch in diameter. Crop contained Mountain Bluebird. Canyon on south side of El Capitan Mountain, Lincoln Co., New Mexico, April 13, 1929, elevation 7000 feet.

In the fresh specimens the iris was dark brown, bill bluish horn color, cere and gape bright yellow, legs and feet, bright yellow, claws black.

While their actions were those of nesting birds yet I failed to locate a nest near by.

Another Zone-tailed Hawk was seen above the highway, twenty miles west of Roswell, which would be about on the line between Chaves and Lincoln Counties on April 20, 1929. As I did not have a gun with me I could not collect it but did stop and observe it for some minutes; part of the time it was less than one hundred feet from me.—WHARTON HUBER, *Academy of Natural Sciences, Philadelphia, Pa.*

Screech Owl Apparently Poisoned by Spraying Solution.—On June 28, 1929 Miss Helen Hebard of Chestnut Hill, Phila., Pa., brought me a young Screech Owl (*Otus asio*) that had died under rather unusual circumstances. She found the Owl upon the lawn and in the hope of obtaining a photograph of it took it to the house. Before she could get her camera the Owl was dead. Upon opening it I found six large Catalpa caterpillars (*Ceratomia catalpae*) in the stomach.

Upon examination the caterpillars showed traces of arsenate of lead. As the trees upon an adjoining lawn had just been sprayed with this solu-

tion it is probable that the parent bird had fed these poisoned caterpillars to the young, unwittingly causing its death.

It seems very desirable to analyze stomachs of birds found dead on or adjacent to lawns that have been treated for the extermination of Japanese beetles, in order that we may know to what extent the birds suffer.—WHARTON HUBER, *Academy of Natural Sciences, Philadelphia, Pa.*

Insect-catching Tactics of the Screech Owl (Otus asio).—During the spring of 1929 Screech Owls nested in an aged apple tree near our house at Bethany, Brooke County, West Virginia. By May 20 the young birds were old enough to clamber about their nesting chamber and to stick their comical heads out of the opening in the stout shell of the tree. The parent birds usually spent the afternoon dozing in favorite spots, sometimes directly in the sunlight. With the lengthening of afternoon shadows the young became active and sometimes squealed for food, but the parents never began feeding before twilight.

On May 23, a friend and I posted ourselves under the apple tree so as to watch the interesting family. With a chuckle the smaller parent, probably the male, swept out from the tree and crossed the creek. The larger parent, however, stayed in the tree for some moments, then flew to a nearby elm where, silhouetted against the sky, her movements were easily followed. At first we were somewhat mystified by her actions. Soon we made out, however, that she was capturing insects which were flying about the peripheral twigs of the tree. Some of these she evidently snatched from the twigs or leaves with her feet; others she caught in mid-air, with her beak. Since I had never known Screech Owls to capture prey thus I changed my position so as to be able to see the bird more clearly. From my new station under the elm tree I saw the bird catch thus, Flycatcher-wise, at least twenty insects, most, if not all of them, the large beetles locally called June bugs or May beetles. We watched her for at least three quarters of an hour. She caught about two insects a minute, returning promptly to feed the noisy young. The other parent did not return during our period of observation. I think he was searching for larger quarry.

On the night of June 20, a friend and I watched a Screech Owl in the yard swooping toward the ground. We both received the definite impression that the bird was capturing fireflies in its beak. Once, as the bird sat still for a moment, a captured beetle, held in the beak, flashed its light for an instant and disappeared. We think that the beetle was swallowed. If the Screech Owl regularly eats these insects it is the only bird in the vicinity which does so, to the best of my knowledge.

This habit of capturing insects with the mouth, on the wing, instantly called to my mind the characteristics common to the Orders Strigiformes and Caprimulgiformes. Birds of both Orders have soft, lax plumage permitting noiseless flight; both are at least to a degree, nocturnal, possessing relatively large eyes. The mouth of the Screech Owl, while hardly to be compared with that of the Whip-poor-will from the standpoint of size, is,

nevertheless, relatively large or wide, and the hair-like feathers of the nasal portion of the facial disc probably perform the same insect-catching function as the enormously developed rictal bristles of the Whip-poor-will. —GEORGE MIKSCH SUTTON, *Bethany, West Virginia.*

Ani (Crotophaga ani) Wintering in Florida.—I would like to give some additional observations on the Ani which was reported by Mr. William G. Fargo in the Auk, Vol. XLVI, pp. 388–389. Not until I read his article did I know that Mr. Fargo had found this same bird in Florida.

This Ani was first seen by me on January 24, 1929, among the mangroves surrounding a small pond, east of the Don Ce-Sar Hotel, near Pass-a-Grille, Pinellas County. It was seen at the same place two days later, January 26, when I returned to try to collect it. After passing up a good shot to study the bird more closely I was then unable to get within range of it again. The third observation of this Ani was not until February 17, and I then decided to see how long the bird would continue to stay. I looked for it again on March 3 and 17, not knowing that it had been collected in the meantime by Mr. Fargo on February 25. We therefore know that this Ani was present for at least a month during the winter.

The Ani is rather similar in appearance to the Boat-tailed Grackle but the heavy blunt bill is quite apparent and diagnostic. Its short jerky flights from one mangrove clump to another were confined to a very limited area. The only notes I heard were harsh and discordant whistles.

Dr. Harry C. Oberholser of the Biological Survey sent me the following summary of the occurrences of the Ani in the United States:—"The only records of the Ani (*Cropophaga ani*) outside of Florida are those from Philadelphia, and Edenton, North Carolina, and several records from Louisiana in Saint Bernard and Plaquemine Parishes. The most northern record of its occurrence in Florida is Brevard County, made in the early spring. A number of the records of this bird from Florida are for the summer season but it apparently occurs at all times of the year."—PHILIP A. DU MONT, *Wilton, Connecticut.*

Feeding Habits of Chimney Swifts.—Last summer, 1928, I had an unusual opportunity to watch at close range the feeding of a brood of Chimney Swifts. It may have been a second brood, as the time was late July and early August. Our home near Lawrenceville, Virginia is in a very old house that has two large stone chimneys, with fire-places that will take a four foot back log, and with a "throat" large enough to admit in reality, a fairly good sized Santa Claus. In these old chimneys there is an offset, or ledge, at the top of the back-wall of the fire place, which in this case is about a foot wide.

At midday July 25, a heavy rain dislodged a nest containing four young Swifts, and both nest and nestlings fell to the ledge at the top of the back-wall. The cries of the young very soon attracted my attention to them, and by sitting on a low stool on the hearth I could look under the arch of

the fire-place and see them at a distance of less than three feet. At this time the young birds were quite well feathered, with wing and tail feathers well started. Unfortunately I had kept no record of the date when they were first heard in the chimney, but believe they were more than a week old at the time of the accident. When first found, very soon after the storm, all were sprawling in the soot on the ledge; but in a few minutes two of them began to climb the back wall of the chimney and an hour later were clinging to the rough wall, side by side, about fourteen inches above the ledge. The other two continued on the ledge near the fallen nest all the afternoon. The old birds kept flying into the top of the chimney, but did not come down to the young ones that day. Every time this happened the young set up a squeaking that must have been a distress call. To quote from my notes written at the time, it was a loud, harsh squeal, quite unlike the chattering they always make when being fed.

The next morning, very soon after daylight the old birds began coming down to the two young on the wall and feeding them. I did not see them feed the two on the ledge, but these very soon began climbing the wall, joining the first two. The four huddled close together, side by side, heads up and stubby tails braced against the wall below them.

From the start the old birds did not see me sitting on the hearth, or, seeing they paid little attention. I was much surprized to see that they always fluttered down and lit on the wall a little below the young birds, bracing themselves in the same manner as the young and reaching up to feed them. The young would turn their necks down as far as possible without changing the position of their bodies. The old birds would stretch up, putting the bill inside the gaping mouths of the young, and seemingly feed by regurgitation. This was invariable during the time I spent watching them, which amounted to a number of hours.

The four young clung to the wall without moving noticeably, always side by side, and were fed from daylight until dark at intervals of from 1 to 28 minutes until July 31, when I was obliged to leave home. I fully expected they would leave the chimney before my return, but when I reached home the afternoon of August 5, the first thing I heard was the young Swifts in the chimney. They had now climbed up the wall to about six feet above the ledge and were somewhat scattered. By putting my head into the throat of the chimney and looking up, I could still see them quite well. They continued thus until August 13, when they were fed in the chimney late in the afternoon; but were gone the morning of the 14th.

During the last week of their stay in the chimney they spent hours and hours fluttering their wings as if to exercise them. Thus, no doubt, they gained the strength necessary for the life of constant flight that they were soon to begin all at once. These young Swifts, with feather growth well started before the nest fell, were fed in the chimney nineteen days after the fall. A brood of Carolina Wrens that were under observation at the same time, left the nest when twelve days old.—John B. Lewis, *304 Mitchell St., Ithaca, N. Y.*

Alaska Longspur in New Mexico.—In the recent book entitled 'The Birds of New Mexico' by Florence Merriam Bailey, I fail to find any mention of the Alaska Longspur (*Calcarius lapponicus alascensis*) having been taken within the borders of the State.

I collected a female, No. 86128 Coll. Acad. Nat. Sciences, Phila., March 25, 1929. It was feeding with a flock of Chestnut-collared Longspurs near Slaughter's Lake, an artificial lake for watering sheep, ten miles southwest of Picacho, Lincoln Co., New Mexico, at an elevation of 5500 feet.—Wharton Huber, *Academy of Natural Sciences, Philadelphia, Pa.*

Nelson's Sparrow Nesting in Minnesota.—A nest and eggs of Nelson's Sparrow (*Ammospiza nelsoni*) were collected on June 21, 1929, in Kittson County, Minnesota, the county occupying the extreme northwest corner of the state. The bird was known to nest in this area from a juvenile bird collected in Marshall County during June of 1928, and the present record came as the result of a week's concentrated search.

The section of the county where the nest was found is made up largely of extensive, swampy lakes bordered here and there with strips of tamarack. Poplar thickets and a few bits of prairie occupy the higher ground. A number of the shallow lakes have been entirely overgrown with a more or less floating layer of sphagnum, and on this, wiry sedges are thriving so as to give the uncertain expanse the appearance of a perfectly firm, level meadow. It was along the border of such a meadow of about two square miles in extent that the nest was found. The meadow itself was covered with about six inches of water but the nest was built just above the water level where the soil, although very damp, was free from standing water. It was constructed of coarse grass lined with finer grasses and rested on the ground, being not in the least sunken. A tiny dead willow a few inches high supported one edge of the nest but no definite clump of vegetation surrounded it. The three eggs were perfectly fresh and were identical in size, measuring .72 by .50 inches. Their ground color was a quite definite bluish-green. A rather dense wreath of light brown specks mixed with purplish encircled the large end while the remainder of the egg was sparsely but evenly speckled with light brown.

Before the nest was disturbed, several hours of waiting were necessary to allow the bird to return in order that she might be collected immediately upon flushing from the eggs. The female bird, nest, and eggs are now in the Museum of Natural History at the University of Minnesota in Minneapolis.—W. J. Breckenridge and Wm. Kilgore, *Museum of Natural History, University of Minnesota, Minneapolis, Minn.*

The Genus Brachyspiza not Distinct from Zonotrichia.[1]—In 'The Auk,' vol. 15, 1898, p. 224, Mr. Ridgway created the monotypic genus *Brachyspiza* for the reception of *Fringilla capensis* Müller, and from that date forward, the name has been universally applied to the single, wide-

[1] Contribution from the California Institute of Technology.

ranging, highly variable species. Originally, comparison was made with *Melospiza* Baird. Later, in part 1 of 'Birds of North and Middle America,' 1901, p. 346, *Brachyspiza* was again primarily compared with *Melospiza* and secondarily with *Zonotrichia* Swainson, in which latter genus *Fringilla capensis* had usually been placed until the erection of *Brachyspiza*.

The present writer has recently had occasion to investigate the status of *Brachyspiza* and has come to the conclusion that it is not sufficiently different from *Zonotrichia* to justify recognition. Even as a sub-genus its standing appears doubtful, unless two other sub-genera—one to include only *albicollis*, the other to include *leucophrys*, *gambeli*, *coronata* and *querula*—are to be recognized also. The differential characters ascribed to *Brachyspiza* as compared to *Zonotrichia* are "relatively much shorter and more rounded wing, much shorter tail and longer tarsi." Examination of all the species involved does not support such a claim. The accompanying table of proportions is based on five mature specimens of each form, selected only in the sense that they are in reasonably fresh, fully acquired plumage. Five specimens of each would seem to be an ample number where only generic differences are involved, but to make sure on this point, fifteen specimens each of *costaricensis*, *albicollis* and *querula* were measured as a check after the table was completed. The final differences between five and fifteen specimens of each of these forms showed in every case a result varying less than one-half of one percent. For the sake of convenience races are treated as species.

Relative proportions of Tail to Wing		Relative proportions of Tarsus to Wing		Relative proportions of Tarsus to Tail	
albicollis	101%	albicollis	37%	albicollis	36%
nuttalli	97	nuttalli	32	costaricensis	36
querula	97	costaricensis	32	canicapilla	34
leucophrys	94	querula	31	nuttalli	33
coronata	94	coronata	30	coronata	32
gambelii	93	gambelii	29	gambelii	31
costaricensis	90	leucophrys	28	querula	31
canicapilla	77	canicapilla	26	leucophrys	30

Note that between "short-winged" and "long-winged" races of *capensis* represented by *costaricensis* and *canicapilla* respectively, there exists a far greater difference in wing and tail ratios than is the case among the other forms; also that in this respect *albicollis* differs more from *nuttalli* than does *gambelii* from *costaricensis*. As to "roundness" of wing, the five *costaricensis* are duplicated in wing formula by four out of the five *albicollis* and one of the *nuttalli*. The wing tip, that is the distance from the tips of the longest secondaries to the tips of the longest primaries, ranges in length proportional to the total wing from 22% in *querula* and *canicapilla* down to 16% in *albicollis* and 10% in *costaricensis*.

Finally, through an intimate field acquaintance, I can class *costaricensis*, at least, as a *Zonotrichia* in actions, song, nesting, and the ecologic niche occupied.—A. J. VANROSSEM, *Pasadena, California.*

Savannah Sparrow Nesting near Reading, Pa.—Throughout the month of June 1929, I frequently saw Savannah Sparrows (*Passerculus sandwichensis savanna*) in a dense growth of weeds along the west side of the newly formed Ontelaunee Dam near Reading, and from the fact that pairs were usually noted together, I became suspicious that they were breeding nearby.

I devoted several hours on successive visits to searching for one of the suspected nests, but due to the tangled growth and the noncommittal actions of the birds, was about to give up the search, when on July 14, Mr. Byron Nunemacher and I saw on the east bank of the dam, opposite from where the first birds were observed, two pairs carrying mouthfuls of green "worms," and displaying every indication of having young.

A careful search of the surrounding area revealed one of the young, evidently just out of the nest, and capable of fluttering but a few inches at a time.

This is, I believe, the first recorded instance of the nesting of this Sparrow in southeastern Pennsylvania since the publication of Stone's 'Birds of Eastern Pennsylvania and New Jersey' (1894), when Dr. John W. Detweiler reported it as breeding at East Bethlehem, and may indicate an extension of its breeding range, as noticed recently in the neighborhood of New York City by Ludlow Griscom. At least four pairs were present in this locality.—EARL L. POOLE, *Public Museum, Reading, Pa.*

Another Cardinal in Colorado.—This species is a rare bird for this state; its recent occurrence at Littleton, Colorado, was reported by the writer in 'The Auk' of January, 1927, and now the presence of another individual of this species in the state needs to be recorded. It has been learned recently that a Cardinal has been resident during the past three years in a small town not very far north of Denver. The exact location of this bird's home is not included in this report because it happened that within a short time after the Littleton Cardinal was recorded it disappeared. The writer has the best of reasons for believing that this bird was shot for, or by, a Denver collector.

It is a great pity that this hardy pioneer could not have been left in its effort to establish its strain in this neighborhood. Several bird lovers in Littleton have expressed ire and regret over this wanton killing of a bird that they hoped would lead to many others of its kind in their vicinity. These are the things which set the public against even legitimate bird collecting. Such thoughtless deeds have come to our notice many times during the last fifty years.—W. H. BERGTOLD, *Denver, Colo.*

The Siberian Bank Swallow and Other Records from Point Barrow, Alaska.—The representative of the Chicago Academy of Sciences

at the northernmost part of Alaska, Mr. Charles D. Brower, collected an interesting lot of birds during the summer of 1928. The shipment, which was recently received, included a Bank Swallow which appears to be *Riparia riparia ijimae*, and two warblers, *Oporornis tolmiei* and *Wilsonia pusilla pileolata*. The Warblers appear to be northernmost records for the species, while the Swallow is a new record for North America. The Bank Swallow was submitted to Mr. Outram Bangs for identification, and he has written me regarding the specimen, as follows:

"It exactly matches *Riparia riparia ijimae* (Lönnberg) of Sachalin Island and east Siberia, of which we have plenty of skins. It is much darker than any specimens we have of *Riparia riparia* from anywhere in the east here. The question then naturally comes—is it really a stray migrant of *ijimae*, as is perfectly likely, or is it an exceptional variant of *riparia*? I can assure you now that it is an exact match for *ijimae*, and I believe it is an example of that form."

The data for a few of the specimens collected at Pt. Barrow, Alaska, are as follows:

Riparia riparia ijimae, juv. Siberian Bank Swallow, Sept. 15, 1928. No. 2100 Chicago Acad. Sci.

Oporornis tolmiei, Macgillivray's Warbler, ♂ Sept. 12, 1928. No. 2099 C. A. S.

Wilsonia pusilla pileolata, Pileolated Warbler, ♂ Sept., 1928. No. 2093 C. A. S. (Inland along Meade River, 60 miles from Barrow.)

Rissa tridactyla pollicaris, Pacific Kittiwake, immature, Sept. 19, 1928. No. 2043 C. A. S.

Rissa tridactyla pollicaris, Adult ♀ Sept. 28, 1928. No. 2057 C. A. S.

Larus argentatus thayeri, Thayer's Gull, Immature ♂ Sept. 11, 1928. No. 2087 C. A. S.

Larus argentatus thayeri, Thayer's Gull, ♀ Sept. 11, 1928. No. 2088 C. A. S.

Larus argentatus thayeri, Thayer's Gull, ♀ Sept. 26, 1928. No. 2045 C. A. S.

Pagophila alba, Ivory Gull ♂ Sept. 26, 1928. No. 2060 C. A. S.

—Affred M. Bailey, *Chicago Academy of Sciences, Chicago, Illinois.*

Connecticut Warbler Nesting in Minnesota.—On June 30, 1929, in upper Aitkin County, we found a nest of the Connecticut Warbler (*Oporornis agilis*) containing five young, several days old.

The nesting site was in a rather open spot in a dense spruce and tamarack swamp. Here the ground was covered with a deep carpet of cold, wet sphagnum moss where, patches of Labrador tea, clumps of pitcher-plants, and an occasional swamp laurel, now out of bloom, formed a thick undergrowth.

The nest, constructed of fine dry grasses and almost entirely hidden by the Labrador tea, was sunken several inches into the damp moss at the top of a large sphagnum mound. The opening, viewed from above, appeared to be a round, black hole in the moss and, like Thomas of old, we had to insert our fingers to make sure that the nest was really there.

During our long search for the nest, the parents were seen only three or four times. After their home had been discovered, however, and they knew we had learned their secret, they became quite tame and unsuspicious, frequently feeding their young while we were preparing to photograph the nest.

In bringing food to the young, the parents never flew directly to the nest. They would alight in a tree some fifteen or twenty feet away, give the sharp, loud call note, then slowly and deliberately descend to earth by dropping from branch to branch. Once on the ground they were lost to sight in the thick vegetation, yet, we could frequently follow their movements by the slight disturbance of the leaves and grasses which betrayed the passage of the birds through the tangle of plants. Now and then we would catch a glimpse of one or both as they walked or ran through some little open spot. They were most difficult to see on the ground as their olive-green backs harmonized so well with the leaves of the Labrador tea and their yellow underparts blended so perfectly with the yellowish-green sphagnum moss. The most conspicuous thing about them was their large and almost glaring-white eye-rings.

The adult male and one nestling were taken for the museum collection and the empty nest was secured a few days later.

The nestling, which was just passing from the downy to the juvenile plumage and was probably far enough advanced to leave the nest within two or three days, shows the following characters. Upper parts dark olive-brown, breast and sides snuff-brown merging into buffy-yellow on the belly, legs and feet very light flesh color.

Earlier in the season and in the same general locality, a nest of the Connecticut Warbler containing four fresh eggs was found by Mr. N. L. Huff of the Botany Department of the University of Minnesota. A record of this nest will be found in this issue of 'The Auk,' (pp. 455–465).—William Kilgore and W. J. Breckenridge, *Museum of Natural History, University of Minnesota, Minneapolis, Minn.*

Nesting of the Connecticut Warbler in Alberta.—In connection with the discovery of nests of the Connecticut Warbler (*Oporornis agilis*) in Minnesota by Mr. Huff and by Messrs. Kilgore and Breckingridge, described in the present issue of 'The Auk,' the question arose as to previously discovered nests of this species. The one taken by Seton in eastern Manitoba was apparently the only one on record but there was a general impression that another had been found in Alberta and Mr. Huff asked if I could give him any information about it. I remembered distinctly having a note from my friend Richard C. Harlow a few years ago announcing the finding of this nest and promising me an account of it for 'The Auk,' but press of other work prevented his writing his paper. I tried to get in touch with him but was unsuccessful and then discovered that one of his sets had come into the possession of Mr. J. Parker Norris, Jr., who very kindly placed me in possession of all the information regarding

the nest and it is published below so that Mr. Harlow may have the credit due him for his discovery and that the account of Mr. Huff may be brought up to date.

Mr. Norris writes me that Mr. Harlow found two nests each containing four eggs, the first on June 15, 1923 and the second on June 19, of the same year, and adds "the second set is now in my collection. The eggs are dull white free from gloss and are heavily blotched particularly at the larger end with rich brown together with a trace of lilac; they measure .81 x .58, .78 x .58, .78 x .59, .79 x .61 inches. The locality was near Lac La Nonne, northern Alberta. Mr. Harlow states 'the nest was located at the base and against a small tuft of dry grass in open growth of poplars at the edge of a small opening in rolling country, covered with dry poplar woods and within 30 feet of a willow thicket into which the female always went. I flushed the female from the nest, sat down and she returned three times in an hour, once perching five feet from me. The white eye ring was very conspicuous as I watched her on the nest at a distance of five feet; while she flew into the willows she always walked back.

"'The male sang mostly about 60 yards away but sometimes closer. A vigorous song *'chipity-chipity-chip,'* the same syllables can be used to express the song of the Maryland Yellow-throat, but when close by the song of the Connecticut is so vigorous and ringing that it makes your ears ring. The bird is very deliberate in its movements. The finding of these two nests extends the known breeding range of the species some hundreds of miles. The first migrant that I saw reached the locality on May 28.' Richard C. Harlow."

Mr. Harlow's nests are therefore the second and third to have been found so far as I am aware.—Witmer Stone, *Academy of Natural Sciences, Philadelphia* (with acknowledgements to R. C. Harlow and J. Parker Norris, Jr.).

Identification of Sycamore Warbler in Connecticut was Satisfactory.—In Mr. Aretas A. Saunders' article "Sycamore Warbler in Connecticut" (Auk, XLIII, p. 248), the positive identification of the specimen apparently was settled.

While visiting the Birdcraft Sanctuary in May 1928 I was given permission by the Custodian, Mr. Frank Novak, to take the Warbler in question to the American Museum of Natural History for identification. J. T. Nichols, the late W. DeW. Miller and the late Dr. Jonathan Dwight all agreed in pronouncing it typical of *D. d. albilora*.

The superciliary stripe is distinctly white and the length of the exposed culmen is .44 inches as compared to 12.9 mm. (.51 in.), the measurement given for *dominica* (Ridgway, Bulletin U. S. National Museum, No. 50, II, 1902, 579), and the length of the bill from the nostril .38. In comparing with a series in the Dwight Collection the length of the bill from nostril in *albilora* was .37–.40 (average .392, 11 skins), and in *dominica* .41–.49 (average .441, 11 skins). The white on the terminal portion of inner webs

of three outer tail feathers is also correspondingly greater in extent as compared with specimens of *dominica*.

Besides being an addition to the avifauna of New England this is the first occurrence of this species on the Atlantic Coast north of the Carolinas and east of Ohio and West Virginia. The bird is mounted and in the collection at Birdcraft Sanctuary, Fairfield, Conn.—PHILIP A. DU MONT, *Wilton, Conn.*

The Winking of the Water Ouzel.—In 'The Condor,' XXVII, 1925, pp. 143–144, I reported my observations on the winking of the Water Ouzel or Dipper (*Cinclus mexicanus unicolor*), and concluded that it was not the nictitating membrane that winks, as is generally believed, but the upper eyelid, owing to the fact that the movement is from above downward and not from the inner angle of the eye outward. The movement in a vertical plane points to the eyelid, while the movement of the nictitating membrane is in a horizontal or slightly oblique plane. Only by disregarding and violating the anatomy can one attribute the winking to the nictitating membrane. I also reported that on an examination of skins, I found the eyelids were "clothed with short pure white feathers."

A recent article by E. W. Hendy, in 'The Nineteenth Century,' CV, 1929, p. 358, on the English Dipper bears out my observations and conclusions so thoroughly that I venture to quote it here: "The dipper possesses one curious physical feature which is I believe unique among British birds. It is the upper eyelid, covered with tiny white feathers. When he blinks, as he often does, the white eyelid is most conspicuous against the dark plumage. The play he makes with this quaint feature suggests that he is turning up the whites of his eyes, though really it is the upper eyelid which comes down."—CHARLES W. TOWNSEND, *Ipswich, Mass.*

Mockingbird Nesting Just Outside the Limits of Philadelphia.—There was recently presented to the collection of the Academy of Natural Sciences, Philadelphia, a nest and three eggs of the Mockingbird (*Mimus p. polyglottos*) taken in Mt. Moriah Cemetery, Delaware County, Pa. This cemetery is adjacent to Cobbs Creek Park and just across the City line of Philadelphia.

The notes accompanying the nest and eggs were made by Miss Clara Jessie Clair and are as follows: "May 26, 1929, two birds seen, one singing, May 28 the pair seen, May 29, one bird seen, May 30, nest found in privet bush contained three eggs. June 2, nest abandoned, eggs cold, one bird seen some distance from nest. June 8, nest still abandoned, eggs cold, collected and presented to Academy of Natural Sciences."

While the breeding of a Mockingbird just outside the city limits of Philadelphia is in itself interesting, the composition of this nest is even more so. The nest is made mostly of paper and rags with a very few small twigs and rootlets in the main body; rope, cord, string, waste, hair and a few immortel flowers from the wreaths on the graves. The very thin

lining is of fine rootlets.—WHARTON HUBER, *Academy of Natural Sciences, Philadelphia.*

Notes from Northern New Jersey.—*Spizella monticola monticola.* TREE SPARROW.—An exceptionally late individual of this species was observed on May 5, 1929 at Troy Meadows, N. J. by Messrs. J. L. Edwards, W. Downin, and the writer. This is, so far as can be determined, the latest record for the bird in New Jersey.

Mimus polyglottos polyglottos. MOCKINGBIRD.—A lone bird appeared in a city park in Passaic, N. J. on April 29 and remained at least until July 25. The bird sang profusely throughout its stay and was a very good mocker. It seemed to have a particular aversion to Robins, which it constantly chased out of its "territory."—ROBERT T. CLAUSEN, *Passaic, N. J.*

Notes from Washington, D. C.—*Colymbus holboelli.* HOLBOELL'S GREBE. I watched one of these Grebes for half an hour on the Anacostia River in front of the Washington Navy Yard, D. C., February 5, 1929. The presence of a Horned Grebe (*C. auritus*) nearby enabled me to make direct comparison between the two species. It was seen again February 9.

Clangula hyemalis. OLD-SQUAW. I saw a female on the reservoir at Sixteenth and Kennedy Sts., N. W., D. C., November 20, 1927.

Plectrophenax n. nivalis. SNOW BUNTING. Two seen on the mud-flats off Hains Point, D. C., November 29, 1928, one being secured for the District exhibit in the U. S. National Museum. Mrs. Wm. J. Whiting saw one on the flats at Four Mile Run, Va., January 12, 1929, and here on February 7, 1929 two were noted by Mrs. T. M. Knappen.

Vireosylva philadelphica. PHILADELPHIA VIREO. Two observed in West Potomac Park, D. C., September 8, 1928. At Chevy Chase Lake, Md., September 16, 1928, I watched four for some time; on one occasion within ten feet of me and all lined up on the same limb.

Cistothorus stellaris. SHORT-BILLED MARSH WREN. One flushed in an old field along the Chesapeake and Ohio Canal about two miles east of Cropley, Montgomery County, Md. It was studied at close range, the barred head and tail being noted. This is the fourth definite record for this region.—WILLIAM HOWARD BALL, *1233 Irving St., N. W., Washington, D. C.*

Some Abnormal Breeding Records from the South Carolina Coast.—Together with Mr. E. Milby Burton, of Charleston, S. C., the writer has been engaged in banding many of the breeding birds of the Carolina low country during the past season. Of the many nests seen and examined, a few interesting developments have been noted.

Among a large colony of Least Terns (*Sterna a. antillarum*) on Dewees Island, two instances were noted of a Tern laying its egg in a nest of a Wilson's Plover. When the first one was found it was thought that perhaps, some former observer had placed the Tern egg with the Plover's for mis-

chief, but another was found a short while afterward, and from this nest, a Least Tern was seen to leave the eggs. It was plainly evident that the Tern was incubating both her own egg, and those of the Plover. In many years of observation along this coast, and the hundreds of Tern nests examined these are the sole instances of such a finding. In this colony there were about 100 pair of Terns and 20 pair of Plover.

On the same island, and on the same day which the above observation was made, June 4, 1929, a nest of the Willet (*Catoptrophorus s. semipalmatus*) was found with six eggs. As the normal number of eggs laid by this bird is four, this record is worthy of note. Whether they were the product of one female, or two was not determined. Some unknown agency had disturbed the eggs, two being rolled a few feet down the slight mound which formed the nest, but it was established that, a week before this the nest had been intact, as it was seen by a party visiting the island. It is highly possible that the original owner had rolled the two strange eggs out herself, if, indeed, there were two females involved.

Some two weeks afterward, on a visit to one of the marshland heronries, a nest of the Snowy Heron (*Egretta c. candidissima*) was found which contained six eggs, another very unusual setting. Three or four is the usual number. There were about 125 pair of Snowies breeding on the islet and two nests of six eggs were found.

In a cypress swamp rookery, in one small tree, four species were nesting, the lowest nest being that of a Louisiana Heron (*Hydranassa tricolor ruficollis*), the next a Little Blue Heron (*Florida c. caerulea*), the one above this belonged to a Black-crowned Night Heron (*Nycticorax nycticorax naevius*), and the upper one a White Ibis (*Guara alba*). Even in a thickly populated rookery it is unusual to find so many birds occupying the same tree. In the same rookery which contained the tree with four nesting species, a nest was found which held three well feathered young of the Little Blue, and one Louisiana Heron. The adult was seen to feed all of them impartially.—Afexander Sprunt, Jr., *92 South Battery, Charleston, S. C.*

Notes from Champaign County, Illinois.—During the spring of 1929, I collected the following birds which seem worthy of record.

Passerherbulus lecontei. Leconte's Sparrow. Two males, April 13, Staley.

Chondestes grammacus grammacus. Lark Sparrow. Female, May 8, Champaign, and male, May 9, Urbana.

Spizella pallida. Clay-colored Sparrow. Male, May 21, Urbana.

Vireo belli bell . Bell's Vireo. Female, May 12, Champaign.

Vermivora celata celata. Orange-crowned Warbler. Female, May 12, and male, May 15, Champaign.

Dendroica vigorsi vigorsi. Pine Warbler. Female, April 25, Urbana.—Leland Quindry, *Marion, Illinois.*

Some Observations of the Effects of a Late Snow Storm upon Bird Life.—Northern New England was visited by a late snow storm on April 12, 1929, which deposited ten inches. Light snow fall continued for two days and temperatures remained low for a week following the storm. Until the 16th, the ground remained snow covered and it was not until the 19th that the snow wholly disappeared. The earlier migrants, such as the Northern Flicker, Phoebe, Horned Lark, Crow, Cowbird, Red-winged Blackbird, Meadowlark, Rusty Blackbird, Purple Finch, Vesper Sparrow, Slate-colored Junco, Song Sparrow, Fox Sparrow, Hermit Thrush, Robin, and Bluebird, were present, some of them in large numbers, and many of the winter visitants were also present. The food problem became acute and every possible source was utilized. For the Phoebe, an especially difficult situation existed. Piles of compost kept alive a limited number of insects, as the heat developed from its decomposition raised the temperature close to the surface of the heaps. Phoebes were seen to perch on these and their frequent sallies showed that this opportunity was being improved. In some cases they found entrance to stables and fed upon insects there which had likewise taken refuge from the cold. One individual was seen to perch near a spider's web and fly over to remove flies or moths as fast as they became enmeshed. Other species using barns freely for food and shelter were the Slate-colored Junco and Song Sparrow. Grass seed could be secured in abundance but cats were an element of danger, probably taking heavy toll. Fox Sparrows seemed to mind weather conditions the least of any of the ground feeding species. Where thick bushes caught the snow, or on ledges where it melted as it came, they might be found industriously scratching, the males pausing now and then to fly up to a low perch in tree or shrub and give voice to clear song, perhaps the most beautiful one of the Sparrow family. Hermit Thrushes, and Robins fed on sumac berries (*Rhus typhina*), although in times of normal food supply they manifest no liking for them. Evening Grosbeaks (*Hesperiphona v. vespertina*), also appeared at this time and through the efforts of the three species, the supply of sumac berries, although plentiful, was exhausted.

Although birds were able to find food of some kind, yet there was some mortality. One of the pair of Phoebes that watched the spider's web was later found dead in an old Robin's nest under the eaves. Flickers, Robins, and Bluebirds succumbed to some extent. Robins continued their diet of earth worms by frequenting the roads where traffic kept the ground free from snow. Doubtless some fell victims to the automobile, although the condition of the highways prevented speed. Robins and Bluebirds appeared to suffer more from the cold than other species. A Bluebird was seen sitting close to a chimney, presumably for warmth. Later a dead individual was found on the ground beneath, so probably the makeshift proved ineffective.

The country is by no means destitute of these species, and undoubtedly,

only the weaker perished, but nevertheless, we shall miss our family of Phoebes this summer.—WENDELL P. SMITH, *Wells River, Vt.*

Notes from Cobb's Island, Virginia.—The results of a trip to Cobb's Island, Va., by the undersigned in company with R. O. Bender and B. C. Hiatt on June 7, 8, 9, 10, and 11, 1929, seem to offer enough contrast to those of the Kuerzi brothers in 1927 (See 'Auk,' January, 1929) to make them worthy of attention.

On June 8, Hiatt and Worth discovered two Black-necked Stilts feeding daintily on a small marshy pond near the northern end of the island. They were not flushed, in hopes that they might still be there when Bender had been summoned to see them, but about an hour later a thunder-storm came up, and the birds disappeared. Nor were they to be found there during the following days, thus precluding the supposition that they were breeding birds, as had been fondly hoped. Another rather interesting record is that of a Savannah Sparrow, seen by Worth on June 11, probably a summering non-breeder or a very late migrant. Three Red-backed Sandpipers seen on June 9 by Bender and Hiatt, as well as numerous Sanderlings present during the entire visit, are not mentioned in the Kuerzi's list of shore birds, but as this visit was earlier in the season than theirs, it is not surprising that they were not seen.

A census of the other water birds of the island is interesting because of the unaccountable rarity of certain of them, and the relative abundance of others: Herring Gull, 6; Laughing Gull, 1000; Common Tern, 75; Forster's Tern, 50; Gull-billed Tern, 25; Least Tern, only 10; Roseate Tern, only 1 identified (Bender and Hiatt); Black Skimmer, 1000 (two colonies of 250 and 750); Double-crested Cormorant, 50 (mostly seen migrating north); Red-breasted Merganser, 6; Clapper Rail, 50; Dowitcher, 25; Knot, 75; Semipalmated Sandpiper, 1000; (Least Sandpiper not seen); Willet, 40; Black-bellied Plover, 30; Ruddy Turnstone, 20; Semipalmated Plover, 3; Piping Plover, 2; Wilson's Plover, 20; Oyster-catcher, 20. This includes the birds found on Cordwell's Island, as this is so close to Cobb's as to be practically continuous with it. However, Willets and Wilson's Plovers seemed to be the only breeders on Cordwell's besides a solitary pair of Oyster-catchers. All the Gulls, Skimmers, Terns, and the rest of the Oystercatchers nested on Cobb's.

Probably the most interesting, though tragic, event of the trip was the "Nor'easter" which virtually wiped out all the nests on the islands, and incidentally ruined all chances for banding and photography. On June 8, about 4:00 P. M., the thundershower which probably put the Stilts to flight changed to a heavy downpour. This in turn soon turned into a regular storm with heavy winds and a driving rain. The following day it continued incessantly. That night (June 9–10) the first tragedy occurred. A remarkably high tide, caused no doubt by the gale, swept over the beach and marshes, flooding out all the Laughing Gull and Forster's Tern colonies as well as most of the Skimmers' and Gull-billed and Common

Terns' nests, only those in the highest dunes escaping. Whereas on the day before there had been a large number of Skimmers' and a few Terns' nests dotted along the beach, the next morning's search revealed only twenty nests of Skimmers and a few of Terns which had escaped due to their being built on higher ground. The Laughing Gulls and Forster's Terns in the marshes had fared even worse, for not a single nest was left. A short walk revealed tragedy after tragedy: Gulls nests, with the eggs still in them, were seen floating sedately out to sea; eggs were strewn over the sand in profusion, and here and there a Laughing Gull or Crow (Sp?) was seen feasting on them; at intervals a stray Skimmer would be seen hawking over this scene of desolation, "yowping" disconsolately; everywhere was havoc and confusion and destruction. Occasionally a nest would be found which the devoted parents had not left in spite of the wind, rain, and tide. The eggs were usually half buried, or perhaps there was only one left, but it would be unmistakably an undeserted nest, for the outline of the bird would be clearly visible, mute evidence of how it had sat facing the wind, while the driven sand had slowly piled up against its breast until it had formed a bank an inch or more in height, slowly burying the bird alive, until in desperation it, too, had yielded to the urge for self-preservation and left its treasures to the whims and caprices of the elements.

The Clapper Rails suffered from the storm also, although it was not possible to determine accurately to how great a degree. Several adults and young birds were found drowned, and a large number of eggs, some of them already pipped, were washed ashore. Captain Cobb saw a Laughing Gull carrying off a half-grown young one, still alive, but fortunately rescued it. Under his house he found five more of various sizes marooned on a log, and huddled together, but after keeping them in a basket until they dried out and feeding them some fiddler crabs, they became lively. On being released in a drier part of the marsh, they melted away into the grass, apparently none the worse for their experience.

But the night of June 10–11 was not yet past. If the previous one had not been disastrous, this one was unmistakably so. The rain had ceased on the afternoon of the 10th, but the wind was still strong, and the tide came up higher than ever that night. The remaining few Skimmers' nests were washed away, and only one solitary Tern's nest could be found on the next morning. Even the young Barn Swallows had been swished out of their nests under the house and drowned. Possibly only the Willets escaped, since their nests were usually on the highest dunes.

Although several new nests had already been scooped out by the Skimmers, Captain Cobb predicted that only a few of the birds would nest again, so that the season this year seems to have been a glorious failure!—C. Brooke Worth.

RECENT LITERATURE.

Stresemann's 'Aves' in Kükenthal and Krumbach's Handbuch der Zoologie.[1]—Since the review of the first section of this excellent work of reference[2] three additional parts have appeared, carrying the text to 432 pages, with further sections to follow. The second part continues the account of the nervous system, taking up immediately the organs of special sense with a very complete account of the avian eye. There follows a description of the digestive tract, with consideration of the liver and pancreas, and an account of the respiratory system with special attention to peculiarities of the air-sacs and the trachea. The circulatory system is described in detail with a brief statement regarding body temperatures, which might profitably have been amplified from recent studies in the subject in view of the detail used elsewhere. Under the urino-genital system there is some discussion of the double ovary in certain species, a description of various types of eggs, and detailed notes on embryonic growth, followed by observations on the post-embryonic development of young birds of various types, peculiarities of nestlings, mouth markings, observations on sex chromosomes and inheritance, and experiments in producing changes in secondary sexual characters of male and female, with detailed description of normal characters of this type for many species.

Mating displays conclude this portion and extend into part four, followed by descriptions of nests and nest construction, number of eggs, incubation, the care of young, and parasitism. The last pages begin a statement on the age attained by birds which is to be concluded in the following section.

The work, though detailed, is presented in a highly interesting and attractive form, with abundant illustrations to make clear the various questions treated in the text. The material is drawn from a wide range of literature and contains frequent reference to contemporaneous ornithological writings throughout the World. The system of citation of other authors it is assumed refers to a bibliography to appear at the close of the completed volume.

The work is one that will be of great utility to those sufficiently familiar with the German language to utilize it easily.—A. W.

Phillips' 'Shooting Stands of Eastern Massachusetts.'—Dr. John C. Phillips has made another valuable contribution to the history of wild

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[1] Handbuch der Zoologie. Gegründet von Dr. Willy Kükenthal, herausgegeben von Dr. Thilo Krumbach. Siebenter Band, Zweite hälfte, Sauropsida: Aves, by E. Stresemann. Leiferung 2, December 15, 1927, price 12 Rm.; Leiferung 3, August 15, 1928, price 12 Rm.; Leiferung 4, December 20, 1928, price 10 Rm. Published by Walter de Gruyter and Co., Berlin and Leipzig.

[2] Auk, 1928, pp. 114–115.

fowl shooting in New England in this handsomely printed little volume,[1] which has been privately printed in a limited edition and is being sold for the benefit of the Massachusetts Fish and Game Association.

After a preliminary account of Duck and Goose shooting in eastern Massachusetts, the nature of shooting stands and the relative abundance of the species of wild fowl, there follows a list of all of the shooting stands concerning which the author has been able to obtain information.

The country under consideration is covered with scattered ponds, each of which supports one or more shooting stands, so that the total number runs up to about 230, of which 180 were occupied in 1928; some history of each is given with extracts from shooting records when available. Some of these date back as far as 1876.

In his introduction Dr. Phillips tells us that the total number of Geese shot per year in eastern Massachusetts averages about 4200 (2500–8500) and of Black Duck about 10,000. Live Goose decoys are used to a large extent, probably at the present time some 5000–6000, and a slightly smaller number of live Black Duck decoys.

This little volume will interest a large number of sportsmen who have shot over this region, and will appeal also to the lovers of good books as it is beautifully printed and attractively gotten up with a frontispiece of Canada Geese coming into a pond.—W. S.

Ten Year Index to 'The Auk.'—This indispensible publication[2] has at last appeared and should be secured by everyone who possesses a set of 'The Auk' or who desires to ascertain what has been published on any bird or group of birds, or on the birds of any country or state. No one who has not made use of the two previous 'Auk' indexes can form any idea of the usefulness of these volumes. Suppose, for instance, that we are interested in the bird life of Florida, we turn to "Florida" in the 'Index' and find listed, under authors, not only all of the papers on Florida birds that have appeared in the 'The Auk' during the ten years covered by the 'Index,' but also references to all other papers on the subject which have been reviewed or noticed in the pages of the magazine. We thus are at once in touch with practically the entire literature of the subject for the ten-year period.

The 'Index' follows closely the plan of the two preceding 'Indices' which together covered the period from 1876 to 1910, and brings the compilation up to 1920. As we are now close to the end of another ten-year period it

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[1] Shooting Stands of Eastern Massachusetts. By John C. Phillips. Privately printed. The Riverside Press, Cambridge. 1929. pp. 1–158. (A limited number for sale by the Mass. Fish and Game Asso., 41 Mount Vernon St., Boston, Mass.)

[2] Ten Year Index to The Auk, Volumes XXVIII–XXXVII—1911–1920. Prepared by a Committee of the American Ornithologists' Union. Edited by T. S. Palmer and M. T. Cooke. Published by the American Ornithologists' Union. Lancaster, Pa. 1929. pp. i–xviii + 1–339. Price, cloth $5.00, paper, $4.00 (W. L. MacAtee, 200 Cedar St., Cherrydale, Va.)

is time that plans for another 'Index' should be underway and with the admirable work of the present Committee before us, we cannot but hope that some of the members will be willing to take up this work and associate with themselves others who will profit by their experience and be able to carry on the work in the future.

Dr. T. S. Palmer, Secretary of the Union, generously consented to act as Chairman of the present Committee, a position which he filled most ably in connection with the previous 'Index' (1901–1910) and to his admirable management we are indebted for the excellence of the present work.

Miss May Thacher Cooke, as co-editor, performed many of the tedious duties of comparing and checking the numerous references, while those who verified reference slips, or indexed volumes first hand, are Alexander Wetmore, E. R. Kalmbach, B. H. Swales, A. H. Howell, F. C. Lincoln, W. L. McAtee, J. H. Riley, C. S. Sperry, C. R. Shoemaker and Harry Harris. Dr. C. W. Richmond checked up the synonymy of foreign species while the final copying of the slips was done by Mr. and Mrs. H. S. Bryant and Miss Bryant. Acknowledgement is made to many others for assistance of various kinds so that the 'Index' is distinctly a piece of A. O. U. "community" work. To the Biological Survey acknowledgement is made for the loan of their index slips for eight of the ten volumes which saved the writing of many cards.

An important addition to the 'Index' proper is a 'Biographical Index,' prepared by the chairman, containing the names of all members of the Union who died during the period covered, as well as of all other ornithologists whose deaths have been announced in 'The Auk.' Dates of birth, death and references to biographical sketches, as well as full names, are included.

Members of the Union should express their appreciation of the tremendous labor that the Committee has performed in preparing this 'Index' by securing a copy and thus too, in part at least, reimburse the Society for the expense involved and make possible the continuance of the compilation for future ten-year periods.—W. S.

Mrs. Bready's 'The European Starling on his Westward Way.'—In the foreword to this little book,[1] Dr. Marcus Benjamin refers entirely to the author's study of the songs of the Starling, which constitute Part II of the work and form an original contribution to the study of bird music. There is in this connection a technical discussion of the Starling's "music," a comparison of it with man's music and a consideration of its imitative character; also of the evolution of bird music from primitive forms to the modern scale.

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[1] The European Starling on his Western Way (*Sturnus vulgaris vulgaris*). Concerning his Economic Value, his Varied Song, his Place among Birds and Three Characteristics. By Marcia Brownell Bready. With a Foreword by Marcus Benjamin, Ph.D., Sc. D., LL. D. Editor United States National Museum, Washington, D. C. The Knickerbocker Press New York. 1929. pp. 1–141 + 1 Plate. Price $2.00.

The other two parts of the book, dealing with the economic value of the Starling and its systematic position, are compiled from various sources and contain a miscellaneous series of chapters and paragraphs relating to the bird and to various rather distantly related subjects, such as the organization of the Biological Survey, the origin of binomial nomenclature and modern avian classification. In attempting to cover such a wide field there are inevitably a number of errors such as the association of O. C. Marsh and Alexander Wilson as contemporaries and misquotations of names as "Wm. deWaldron" Miller and "Pusey" R. Lowe.

The little volume is well printed and is illustrated by a colored frontispiece of the Starling from the publication of the Biological Survey by Kalmbach.

Everyone interested in the history of this introduced bird whose relation to our native birds will probably become a much more serious problem in the future, will find a wealth of facts and suggestions in Mrs. Bready's book.—W. S.

Proceedings of the Sixth International Ornithological Congress.—A bulky volume[1] of 640 pages printed in Berlin presents the papers read at the International Congress in Copenhagen, in 1926, some of which have already been noticed in these pages. Most of the papers are in German some in English and one or two in French. Many treat of migration and distribution of European birds, which space prevents our listing. Of the other contributions: Fleming presents an account, with map, of the work of the Canadian arctic explorations; Phillips lists birds of the Western Hemisphere extinct or threatened with extinction; Lincoln reviews bird banding in America; Söderberg gives an interesting account of the work of the Bower Birds and the evolution of their decorative habit; Jesperson discusses birds of the high Atlantic Ocean; Reviere presents the results of a number of experiments on homing pigeons to determine how they find their way; Stadler has a paper on bird music; Hartert on need of more care in collecting; Rensch on the species problem; while oölogy is represented by a list of descriptions of eggs of Brazilian birds by Snethlage and Schreiner. There are papers dealing with the life histories or habits of *Corvus frugilegus* by Chappellier, *Tetrao urogallus* by Zedlitz, *Ardea cinerea* by Verway, and *Pastor roseus* by Schenk, and systematic reviews of the genus *Alisterus* by Neuman, and of *Gyrfalco* by Kirke Swan; on the distribution of certain African birds by Stresseman and Grote, and on the avifauna of the Hawaiian and Galapagos Islands by Suschkin. Dr. Hartert's presidential address opens the volume which, as will be seen, covers practically every phase of ornithology.—W. S.

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[1] Verhandlungen des VI. Internetionalen Ornithologen-Kongresses in Kopenhagen 1926. Unter Leitung des Präsidenten herausgegeben von Dr. F. Steinbacher. Mit 20 Tafeln. Berlin, Februar 1929. Pp. i–vi + 1–640.

Soper's 'A Faunal Investigation of Southern Baffin Island.'—This valuable report[1] is based upon two years' exploration by the author in the interests of the National Museum of Canada from 1924 to 1926. There is an interesting diary covering the itinerery, followed by detailed reports on the mammals and birds. Short reports on the fishes, insects, fungi, pteropoda and fossils, by various authors, complete the volume. Eighty-five species of birds are listed of which sixty-three are water birds. Besides species collected by the author all others recorded from the island are included and there are extracts from the diary of Bernard Hantzsch and from published accounts of Baffin Island birds. The Eskimo names of the birds are given wherever determined.

It is interesting to note the presence of such western species as the Pacific Loon, Steller's Eider and Cassin's Bullfinch (?) occurring with the Greenland Eider, Greenland Redpoll and the Ringed Plover. Dr. R. M. Anderson, in a foot note, records the taking of a nest and eggs of the Greater Snow Goose at Dundas, Devon Island, on June 22, 1928 which is apparently the only breeding record since that of the late Langdon Gibson in north Greenland.

The report is a valuable contribution to the ornithology of a region concerning which our information is very meagre.—W. S.

Reports on Collections of the Whitney South Sea Expedition.—Three papers[2] based on the extremely rich collections of the Whitney Expedition have recently been published by the American Museum. In the first Dr. Murphy and Mr. Mathews report on the collection of Zosteropidae in which four new subspecies of *Z. flavifrons* are described from the New Hebrides Group, together with *Z. lateralis valuensis* (p. 10) Valua Island; *Z. samoensis* (p. 11) Savaii Island, Samoa Group; and a remarkable form allied to *Woodfordia* which is named *Sanfordia* (gen. nov.) *lacertosa* (p. 13) Santa Cruz Island, Santa Cruz Group.

Another paper is by Dr. Ernst Hartert and consists of notes on the Solomon Islands collection and on specimens from the same group in the Tring Museum. The following are named as new; *Spiloglaux roseoaxillaris* (p. 6) Bauro (San Cristobal); *S. jacquinoti eichorni* (p. 7) Choiseul Island; *Guadalcanaria* (gen. nov.) *inexpectata* (p. 8) Guadalcanar, a remarkable Fruit Pigeon allied to *Ptilotis lewini; Dicaeum aeneum becki* (p. 9) Guadalcanar; *Zosterops alberti oblita* (p. 10) Guadalcanar; *Z. murphyi* (p. 11) Kulambangra; *Z. splendida* (p. 12) Ganonga, *Mochthopoeus* (gen. nov.) *amoenus* (p. 13) Kulambangra, allied to *Phylloscopus; Phylloscopus trivirgatus becki* (p. 13) Guadalcanar; *Pachycephala implicata* (p. 13)

[1] A Faunal Investigation of Southern Baffin Island. By J. Dewey Soper. Bulletin 53, National Museum of Canada. Ottawa, 1928. pp. 1–143. Price 25 cents.

[2] Birds Collected During the Whitney South Sea Expedition. VII. By Robert Cushman Murphy and Gregory M. Mathews. Amer. Mus. Novit., No. 356. July 2, 1929. pp. 1–14. VIII. By Ernst Hartert, Amer. Mus. Novit. 364, July 29, 1929, pp. 1–19. IX. By R. C. Murphy, Amer. Mus. Novit. 365, July 30, 1929.

Whitney Island; *P. pectoralis whitneyi* (p. 14) for which no locality is given while the paragraphs relating to it are apparently placed by mistake under the preceding species; and *Mino dumontii sanfordi* (p. 18).

The third paper is by Dr. Murphy and consists of additional comments on Solomon Islands' Zosteropidae based on collections received subsequent to those studied by Dr. Hartert. *Z. alberti hamlini* (p. 3) Bougainville; *Z. metcalfi exigua* (p. 5) Shortland Isl.; *Z. rendovae tetiparia* (p. 7) Tetipari Isl.; and *Z. rennelliana* (p. 10) Rennell Isl. are described as new, while additional information on *Woodfordia superciliosa*, of which eight specimens were secured, is furnished.—W. S.

Nicholson's Census of British Heronries.—This interesting report,[1] the result of the efforts of 'British Birds,' Mr. H. F. Witherby and Mr. E. M. Nicholson and a corps of local observers, shows what can be done in the way of concerted effort, and also offers some interesting comparisons with Heron conditions in the United States.

Outside of the purely ornithological interest the census was undertaken as a contribution to our knowledge of the number of animals in relation to space and time.

From the tabulations presented we learn that there were in England and Wales, in 1928, 254 occupied heronries containing at least 3,744 nests which gives as a probable Heron (*Ardea cinerea*) population 20,000 birds, or one to three square miles, the human population for the same area being 2000 times more dense.

Some of the heronries, while they may have slightly changed their actual location, have been in existence for hundreds of years, that of Althorp Park, Northamptonshire, having a published record as early as 1634. Throughout the greater part of England heronries are rigidly protected by land owners and tenants and some leases have provisions for Heron protection, a custom dating back to the times of falconry, when Herons were used as game for the Falcons. The protection now so generally offered to the birds is a matter of personal concern and not due to law. In some counties where fishing interests predominate Herons are shot as apparently detrimental to this pursuit, but this charge seems not definitely proven. In past years they were esteemed as an article of food, especially the nestlings and young of the year, which as late as the thirties of the last century were eaten in Somerset, "skinned, stuffed and roasted like hare, with strawberries and cream to follow" and up to 1896, in Romney Marsh, they were shot for food.

The destruction of heronries was found to be mainly due to the felling of the trees in which the birds nested, some thirty having been thus destroyed or driven elsewhere during the World War, when timber was needed. Egg collecting has destroyed some heronries, and photographing

[1] Report on the "British Birds" Census of Heronries, 1928. By E. M. Nicholson. Reprinted from "British Birds" XXII, Nos. 11 and 12. Price 3s. 6d. (H. F. and G. Witherby, 326 High Holborn, London.)

apparently drove others away, although some colonies have been persistently visited by photographers without apparent effect. A number of consistently protected heronries, too, have dwindled or disappeared entirely, without apparent cause, which shows how dangerous it is to draw conclusions from single cases.

There are data on the food habits of the birds, on the extent of ground occupied by the heronries, the sort of trees preferred and records of recovery of banded birds. The largest heronry recorded is at Milton Park, Northamptonshire, which consisted of 135 nests from which the numbers decrease to many heronries with only four nests, or less.

The census of Scottish heronries was not sufficiently complete to warrant publication at this time and will appear later while it is proposed to make another general census about 1940 from which comparative data may be obtained.

The work is most interesting and all concerned deserve much commendation.—W. S.

Bulletin of the International Committee for Bird Preservation.—Dr. T. Gilbert Pearson, chairman of the Geneva Conference of the International Committee, summarizes in this pamphlet,[1] the work of the meeting and the principal papers that were presented. These set forth the work of protection, or the need of it, in Italy, Holland, Germany, Bulgaria, New Zealand, Japan, and Hungary and furnish much information of interest to conservationists and to ornithologists. A complete list of the delegates follows.—W. S.

Hausman on the Woodpeckers, Nuthatches and Creepers of New Jersey.—This Bulletin[2] of the New Jersey Argicultural Experiment Station presents a popular account of the birds of these groups which might be termed "trunk feeders," including their habits, structure, food, etc. There are numerous illustrations taken from various publications and some original photographs of woodpecker nests and diagrams of food analyses. The pamphlet is excellently gotten up and should prove an important influence for protection of these valuable birds as well as an aid to young ornithologists.—W. S.

Riley on New Birds from Siam.—Continuing his studies of the collection of Siamese birds that Dr. Hugh M. Smith is sending to the U. S. National Museum, Mr. Riley names[3] three new forms from the mountains of that country: *Hypothymis azurea montana* (p. 165); *Rhipidura albicollis celsa* (p. 166) and *Sibia picaoides cana* (p. 166).—W. S.

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[1] Second Bulletin of the International Committee for Bird Preservation. Compiled by T. Gilbert Pearson, Chairman. 1974 Broadway, New York City. 1929. pp. 1–51.

[2] Woodpeckers, Nuthatches and Creepers of New Jersey. By Dr. Leon Augustus Hausman. Bull. 470 N. J. Agr. Exp. Sta., New Brunswick, N. J., pp. 1–48.

[3] Descriptions of three New Birds from the Mountains of Northern Siam. Proc. Biol. Soc. Wash., Vol. 42, pp. 165–166, May 29, 1929.

deSchauensee on New Siamese Birds.—Mr. Rodolphe M. deSchauensee, who has recently returned from a trip to northern Siam, where he collected birds for the Philadelphia Academy, has described[1] three forms that his studies of the collection show to be unnamed; *Niltava williaminae* (p. 469), *Myiophoneus stonei* (p. 469) and *Leioptila melanoleuca laeta* (p. 470)—W. S.

Huber on New Tachyphonus.—Mr. Wharton Huber in a further study of the collection made by himself and J. Fletcher Street, in 1922, in Nicaragua in the interests of the Philadelphia Academy, has described[2] as new *Tachyphonus delatrii longirostris* (p. 471) from the Great Falls of the Pis Pis River. The race is larger than typical *delatrii* with a noticeably longer bill.—W. S.

McAtee and Beattie on Gourds for Bird Houses.—In this leaflet[3] are many facts about gourds, which are known to have been in use as water flasks as early as 2200 B. C. Their use as bird houses is familiar to anyone who has visited our southern states where groups of them are supported on poles for the use of the Martins, a custom that has been further made memorable in Audubon's plate of this bird.

Mr. McAtee suggests their use also for Wrens, Nuthatches, Titmice, smaller Woodpeckers, the Flicker, Crested Flycatcher, Bluebird and Starling.—W. S.

Recent Papers by vanRossem.—Mr. A. J. vanRossem has been studying a series of specimens of *Sitta pygmaea* and finds[4] that four geographical races can be differentiated: true *pygmaea* from the coast district of California north of Monterey; *leuconucha* from the mountains of northern Lower California and southern California; and two which he describes as new: *S. p. melanotis* (p. 176) from the Rocky Mountain district and *S. p. chihuahuae* (p. 177) from Chihuahua, Mexico.

In another paper[5] he points out that if the genus *Oreothlypis* be merged with *Vermivora*, as seems desirable, the name *gutturalis* for the Calaveras Warbler will be rendered unavailable by the prior *Compsothlypis gutturalis* Cabanis, an *Orepthlypis*, and he proposes for the former *Vermivora rufivpilla ridgwayi* (p. 179).—W. S.

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[1] Descriptions of three New Birds from Northern Siam. By Rodolphe Meyer de Schauensee. Proc. Acad. Nat. Sciences Phila., Vol. LXXXI, pp. 469–470. August 12, 1929.

[2] A Northern Form of Tachyphonus delatrii from Nicaragua. By Wharton Huber. Proc. Acad Nat. Sciences Phila., Vol. LXXXI, pp. 471–472. August 12, 1929.

[3] Gourds for Bird Houses and other Purposes. Leaflet 36, U. S. Dept. of Agriculture. pp. 1–4. May, 1929.

[4] The Races of Sitta pygmaea Vigors. By A. J. vanRossem. Proc. Biol. Soc. Washington, Vol. 42, pp. 175–178. June 25, 1929.

[5] A New Name for the Calaveras Warbler. By A. J. vanRossem. ibid.p. 179. June 25, 1929.

Todd on Pachysylvia.—Mr. Todd has undertaken a monographic study[1] of the birds of this genus based primarily upon the splendid series of six hundred skins in the collection of the Carnegie Museum. He recognizes no less than thirty-five forms referred to twenty-three species. The fact that only three new forms are described shows how carefully the group has been studied by previous authors. The new forms are: *P. semicinerea viridiceps* (p. 191) French Guiana; *P. ochraceiceps viridior* (p. 194) Rio Surutu, Bolivia; and *P. o. nelsoni* (p. 195) new name for *P. o. brevipennis* Nelson.

The descriptions are full, with helpful remarks and comparisons, and there is a useful key to the forms.—W. S.

Burt on the Pterylography of Woodpeckers.—This paper[2] is a detailed study of the feather arrangement in twenty-three species and subspecies of North American Woodpeckers with many text cuts. The results show that the pterylography of these forms is remarkably similar. There are abundant characters diagnostic of a family nature but with the single exception of *Sphyrapicus* none of generic value while specific differences are slight and somewhat variable.

Mr. Burt has made a valuable contribution to an important field in which but few Americans are working. We trust that he will continue this line of research to other groups.—W. S.

Miss Howard on the Avifauna of a Shell Mound.—One of the large Indian shell mounds on the shores of San Francisco Bay, having been condemned in order to make way for a factory, was leveled through the agency of a steam shovel. The University of California took advantage of the opportunity to collect and preserve all artifacts, human and other bones, etc., contained in the mound, and the present report[3] is based upon some 6700 bird bones of which 4155 were identifiable. Fifty species have been identified although no attempt was made to differentiate the Anatidae and Laridae which have been listed as one species each. There were thirty-three water birds, fourteen raptorial, one gallinaceous and two passerine. Four species present in the mound are not now found in the immediate vicinity and one, *Grus mexicana*, has never been recorded from the Bay region. On the other hand twenty species now present are not represented in the mound fauna. The presence of nestling Cormorants points to the existance of Cormorant rookeries on islands within the bay. The bones are usually in a much broken condition indicating perhaps attempts to use them in making whistles or other objects.

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[1] A Review of the Vireonine Genus Pachysylvia. By W. E. Clyde Todd. Proc. Biol. Soc. Washington, Vol. 42, pp. 181–206, July 16, 1929.

[2] Pterylography of Certain North American Woodpeckers. By William Henry Burt. Univ. Calif. Publ. in Zoology. Vol. 30, No. 15, pp. 427–442. June 18, 1929.

[3] The Avifauna of Emeryville Shellmound. By Hildegarde Howard. Univ. Calif. Publ. in Zool. Vol. 32, No. 2, pp, 301–394. July 19, 1929.

There are no Pleistocene species although a few bones show some slight petrifaction.

The collection is fully discussed and many tables of measurements given along with a number of drawings of the bones.

Miss Howard has entered a rather novel field and has produced a paper of much interest both ornithologically and anthropologically.—W. S.

Prof. Patten's 'The Story of the Birds.'—This volume[1] of some 500 pages consists of nineteen radio lectures given by the author, who is professor of anatomy in Sheffield University, to the school children of England. These have been elaborated to some extent and an abundance of excellent illustrations has been added. While the subtitle includes the "habits" of birds we find that that part of the text not concerned with bird structure is entirely devoted to bird song and migration, and the grouping of birds with regard to the time of occurrence, with little or nothing regarding nests and eggs or food habits, which we might expect in a work of this scope.

While the work deals, as is to be expected, with British birds, nevertheless the chapters on the anatomy, structure of feathers, etc., apply equally well to the birds of all countries and present in an easily understood manner a great amount of information. The portion devoted to migration, while presenting the general problem in an attractive manner, still adheres to to the love of home as the inducement to spring migration and the failure of food as the incentive in the autumn. As the book has been written essentially for, and addressed to, young people the author has endeavored to impart a considerable amount of "light and shade" to his exposition and so we find some chapters written in an extremely popular vein and in conversational form while others smack of the technical college lecture.

A good word is said for birds in general and their economic importance while "Birds of Prey" says Prof. Patten "lay claim to far more consideration than is usually meted out to them. Like other predatory animals, they are, in truth *'the salt of the earth.'* Their wholesale destruction by game keepers and farmers has more than once recoiled upon the heads of the destroyers." American Game Commissions should take heed to this and guard against the whirlwind that they seem bent on preparing for future generations to harvest.

Prof. Patten's book should prove of wide interest, presenting in a more or less popular way a vast amount of information not usually included in popular ornithologies.—W. S.

Wetmore on New Birds from Haiti.—Continued study of the birds of the island of Haiti discloses the presence of two additional distinguish-

[1] The Story of the Birds. A Guide to the Study of Avian Structure and Habits. Founded on a Series of Broadcast Addresses Delivered to the Schools in Sheffield. By Charles J. Patten, M.A., M.D., Sc.D., Professor of Anatomy, Sheffield University. Pawson & Brailsford, Sheffield 1928. pp. i–xxvii+1–478, 82 text figures and 29 plates.

able races which Dr. Wetmore describes in the present paper[1] as *Dulus dominicus oviedo* (p. 117) from Gonave Island and *Coereba bananivora nectarea* (p. 118) from Tortue Island.—W. S.

The Ornithological Journals.

Bird-Lore. XXXI, No. 4. July–August, 1929.

Among the Bulrushes. By Frank N. Wilson.—Photography of Pied-billed Grebe and Red-winged Blackbird, presumably near Ann Arbor, Mich.

Birds' Eyes. By Thos. H. Shastid.—Structure and powers of sight discussed. Pigeons were able to detect a small particle of a wheat grain and fly to it at a distance of 70 feet while a human eye could barely distinguish it at a distance of a foot.

The Last Heath Hen. By Alfred O. Gross.—Photographs of the last individual which was seen from December 8, 1928 to May 11, 1929; after which none has been observed.

The colored plate by Sutton represents the Arizona and Red-cockaded Woodpeckers with plumage notes by Chapman and migration dates by Oberholser.

In the Audubon Department is an excellent account of the life of the Green Heron by Dr. Arthur A. Allen.

The Condor. XXXI, No. 4. July–August, 1929.

Nesting of the Laughing Gull in Southern California. By Loye Miller and A. J. vanRossem.

Roadways as they affect Bird Life. By Jean M. Linsdale.—As an offset to the complaints of the number of dead birds found on roadways the author calls attention to the many factors that tend to increase bird life along roadways, increased food supply, shelter, presence of water in ditches or puddles, nesting sites offered by hedges and resting places on wires, etc. He concludes that roadways have been responsible for the increase in the numbers of many species over what they were before the roads were established.

The Function of the Oil Gland. By J. Eugene Law.—An important paper in which Chas. Waterton's claim that the function of the gland is not to lubricate the feathers is upheld with very strong evidence. Mr. Law presents evidence to show that oil is absent from the contour feathers of birds, that the plumage furnishes a waterproof covering without the assistance of oil, and suggests that the function of the oil gland is the lubrication of the beak which is subject to hard usage and would be likely to crumble and wear if not kept in good condition.

The Whooping Crane Continues to Visit Louisiana. By E. W. Nelson.

Notes on Oömetry. By Griffing Bancroft.—A discussion of the value of egg measurements.

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[1] New Races of Birds from Haiti. By Alexander Wetmore. Proc. Biol. Soc. Washington, Vol. 42, pp. 117–120. March 25, 1929.

An Untilled Field for a Revised Kind of Research in Zoology. By Wm. E. Ritter.—An important discussion of the need of research for answering the question "In what way and how well do animals use their heads toward solving the problems by which they are always confronted under natural conditions?" and the intimation that these questions constitute an untilled field, inasmuch as they seem to have fallen between the fields of zoology and psychology, while ecology has not functioned in giving them proper attention. The points involved are many and the suggestions pertinent. The paper deserves the careful attention of field students as it is to them especially that possibilities are open.

A New Cormorant from the Miocene of California. By Loye Miller.—*Phalacrocorax femoralis* (p. 167).

On the Subspecific Validity of *Anser gambelli* Hartlaub. By Nagamichi Kuroda.—In which the validity of the two races of the White-fronted Goose is maintained but the application of Hartlaub's name questioned.

The Wilson Bulletin. XLI, No. 2. June, 1929.

The Heath Hen Census for 1929. By Alfred O. Gross.—With photographs of the "last bird."

Nesting of the Pine Siskin in North Dakota. By Russell Reid.

Nesting of the Pine Siskin in Iowa. By Marie Dales and W. W. Bennett.

Pine Siskin in Nebraska, its seasonal Abundance and Nesting. By Myron H. Swenk.—These three papers are fully illustrated with photographs of nests and describe one of those occasional nestings of this species south of its usual range.

Notes on Bird Mimicry with Special Reference to the Mockingbird. By Frank F. Gander.

Some Unusual Water Bird Visitors to Tennessee. By Albert F. Ganier.

The Oölogist. XLVI, Nos. 6 and 7. June and July, 1929.

A Trip to Ram Island, Mass. By Charles L. Phillips (June).

Black-necked Stilts Nesting on the Atlantic Coast of Florida. By R. C. Hallman.

Also a record of Green-tailed Towhee at Regina, Sask. (p. 96) (July).

Bulletin of the Northeastern Bird-Banding Association. V, No. 3. July, 1929.

Migration in Relation to Barometric and Temperature Changes. By Wm. Rowan.—A remarkable departure of migrant water-fowl coincident with slightly falling temperature, very high barometer and clear skies.

An Unusual Mallard Return. By F. C. Lincoln.—Nested three years in the same box at Antioch, Neb.

White-throated Sparrow Plumages. By Marion T. Boggs and John T. Nichols.—Interesting data on molt. The dull plumage may be carried for more than a year, and the high nuptial dress may become much duller at a subsequent molt.

Studies of a Barn Swallow Colony. By Helen J. Robinson.

In the short notes E. C. Hoffman reports a Cowbird depositing two eggs in captivity over night and suggests that, by the ability to delay egg laying, part of the period of incubation may be represented by a period of retention which would make the incubation period of this species apparently shorter than that of its victims.

The Cardinal. II, No. 6. July, 1929.

Consists of a list of books on Ornithology in the Carnegie Library of Pittsburgh, Pa.

The Murrelet. X, No. 2. May, 1929. (Mimeographed journal).

Afield and Afloat with Dawson. By J. M. Edson.—Diary of trips with the late W. Leon Dawson.

Numerous local notes on birds of Washington.

The Wren-tit. I, Nos. 1 and 2. January and April, 1929.

An Unusual Nesting of Cliff and Barn Swallows. By Gayle Pickwell.—In an old boat house mired in the mud. (January).

Finches and Elms. By Gayle Pickwell.—Notes the acquired habit of various birds to feed on elm seeds.

The Ibis. (XII series). V, No. 3. July, 1929.

On the Birds Collected during the Fourth Expedition to French Indo-China. By J. Delacour. Part II.

On the Nesting of the Penduline Titmouse (*Remiz pendulinus pendulinus*) in the Camargue. By William E. Glegg.

Some Miscellaneous Notes on European Birds. By W. A. Payn.

Notes on the Nesting and Plumages of Vultures. By Willoughby P. Lowe.

Some Notes from southwestern Transylvania and the Banat of New Rumania. By W. M. Congreve.

Birds of the Alps in Winter. By J. B. Watson.

Further Notes on the Ornithology of the Naples District. By B. W. Tucker and J. G. vanOordt.

Bulletin of the British Ornithologists' Club. CCCXXXIV. July 10, 1929.

An account of lantern slides of Australian birds exhibited by Mr. Clifford Coles.

David Bannerman discussed the Harlequin Quails and proposed as new *Coturnix delegourguei arabica* (p. 109) South Arabia; N. B. Kinnear proposed *Certhia familiaris ripponi* (p. 109) in place of *C. f. intermedia* preoccupied; Rothschild and Hartert describe *Manucodia ater subalter* (p. 110) Aru Islands.

British Birds. XXIII, No. 2. July, 1929.

Notes on Breeding Habits of the Eider in the Orkneys. By D. J. Robertson.

The Walking of the Fulmar Petrel. By C. Noble Rollin.—Confirms the statement that no Petrels can walk on their toes, notwithstanding the many plates and mounted specimens to the contrary, but makes the exception that he has seen the Fulmar do so very rarely.

Behaviour of Titmice under Artificial Conditions. By Alice Hibbert-Ware.—Fed peanuts on a window sill and inside the room, the birds returned to the same window the next season, indicating the possession of a non-instinctive memory.

British Birds. XXIII, No. 10. August, 1929.

Notes from Lancashire and Manx. Also a figure of a Tawny Owl pellet containing the entire skull of a Snipe with bill intact; and a photograph of a Mallard's nest in a Crow's nest.

British Birds. XXIII, No. 1. June, 1929.

Contains another of Wm. Rowan's admirable articles on the Alberta Waders covering the two Yellow-legs, illustrated by the author's exquisite pencil drawings.

The Oölogists' Record. IX, No. 2. June, 1929.

A Day with Menura novae-hollandiae (Superb Lyrebird). By J. A. Ross.

Observations on Some of the Raptores Breeding in the Beatrice District of Southern Rhodesia. By Walter Krienke.

The Nest of *Scotornis climacurus*. By C. R. S. Pitman.

Notes on the Breeding of the Black Rail (*Limnocorax flavirostris*). By C. R. S. Pitman.

The Avicultural Magazine. (Fifth series) VII, Nos. 6, 7 and 8. June to August, 1929.

Articles on the Pigeons by T. H. Newman run through all three numbers.

There are colored plates of Elliott's Pitta (June) and Fire-tufted Barbet (*Psilopogon pyrolophus*) (August).

Aviculture. (Series II) I, Nos. 3 to 7, March to July, 1929.

This excellent journal has changed its name from the 'Avicultural Magazine' a name already in use by the British magazine.

Anyone not acquainted with the progress of aviculture in America will be astonished at the amount of data contained in this publication, derived wholly from the experiences of American aviculturists; and those desiring to take up this line of work will find here all the information that they desire. Two articles of especial interest to the ornithologist are Lee S. Crandall's account of his collecting of Birds of Paradise and Dr. Leon Patrick's account of the collection made for the San Diego Zoo by Henry Staats, Jr. There are handsome colored plates of two Starlings, *Cosmopsarus regius* and *Spreo superbus* (June) and a group of Lovebirds and Parakeets (July).

The Emu. XXIX, Part I. July, 1929.

Barnardius occidentalis and its allies. By J. R. Kinghorn.—With a colored plate.

Land Birds of Lord Howe Island. By M. S. R. Sharland.—Rats have exterminated several native species of birds, and Owls have been introduced from Australia in an attempt to keep down these "vermin." Our "enlightened" American game commissions, which are bent upon exterminating the Hawks and Owls, which they term "vermin" should take warning, before it is too late, of the economic value of the birds they are destroying.

A Proposed National Park. With Continuation Notes on the Avifauna of the Upper Reaches of the Macleay River. By J. J. DeWarren.

Australian Birds and their Island Home. By J. A. Leach.—An interesting and instructive analysis of the Australian avifauna.

Arrivals and Departures of Birds in South-Western Victoria. By C. Sullivan.

Robins. By Hugh A. C. Leach.—Very different birds from our American or the English bird of the same name.

Through a Drought-Stricken Land. By W. D. K. MacGillivray.—Parts of Queensland which have suffered the most severe drought since the discovery of the country. Many excellent photographs of Australian birds are presented.

The South Australian Ornithologist. X, Part 3. July, 1929.

A Trip to the Islands near the River Murray Mouth. By J. Sutton.

Letters from John Gould to F. G. Waterhouse. By J. Sutton.—In the South Australian Museum of which Waterhouse was Curator.

The Bateleur. I, No. 2. April, 1929.

Further Notes on the Birds of Uganda. By H. F. Stoneham.

European Migrants in E. Africa. By H. F. Stoneham.

Many local notes on African birds.

Alauda. I, No. 2. June, 1929.

The Distribution of *Petronia petronia petronia* in France. By J. Delamain.

Remarks on the ethology of *Passer simplex*. By H. Heim de Balsac.

Note on the Great Swift of Madagascar (*Micropus melba willsa*). By L. Levauden.

An analysis of the Voice of Birds. By H. Jouard.

L'Oiseau. X, No. 6. June, 1929. [In French].

Notes during an excursion in New Caledonia. By J. A. Leach.

A New Case of Hybridity among the Hummingbirds. By J. Berlioz.—*Agyrtria fimbriata nigricauda* × *Hylocharis cyanus*. A list of other recorded hybrids is appended.

The Characteristic Avifauna of the Department of Loir-et-Cher. By R. Reboussin (continued in July).

L'Oiseau. X, No. 7. July, 1929. [In French].

The Blue Titmice of Europe. By M. Legendre.

The Cold and the Birds during the Winter of 1928-1929. By A. Hugues.

Articles on Pigeons by T. H. Newman and on instructions for transportation of live birds by J. Delacour run through the avicultural departments of both issues.

Journal für Ornithologie. LXXVII, Heft 3, July, 1929. [In German].

Remarks on the Biology of the Geese. By E. Christoleit.

The Palaearctic Jays (*Perisoreus infaustus*). By P. Suschkin and B. Stegmann.—Fifteen subspecies recognized of which six are described as new.

My trip to the Islands between Flores and Celebes. By V. vonPlessen, followed by a report on the collection from Djampea and adjacent islands by W. Meise.—With descriptions of fourteen new races.

On the Breeding Habits of the Nutcracker (*Nucifraga c. caryocatactes*). By M. and H. Bartels.—With beautiful photographs.

Uragus.[1] Vol. VIII, pts. 3–4, 1928. [In Russian].

The Avifauna of Lake Bolschye Rakity and its immediate vicinity. By G. A. Welishanin.

Preliminary List of the Birds of the Tobolsk Region. By M. Tarunin.—A nominal list of 208 species.

On the Birds in the Vicinity of Smeinogorsk. By V. Selewin.

On the Habits of *Circus melanoleucus* Forster in the Ussuri Region. By G. Dulkeit.

An Oological Expedition to Lake Tschany. By S. D. Lavrov.

Miscellaneous contributions.

Bibliography.

Uragus.[1] Vol. IX, pt. 1, 1929. [In Russian].

In Memoriam, Prof. P. P. Suschkin (with portrait). By A. Tugarinow.

The Birds of the Barnaul Region. By A. P. & G. A. Welishanin.

Supplement to the Avifauna of the Alej Steppe. By V. Selewin.

Buteo vulpinus, its Life History and Distribution in the vicinity of Tomsk. By B. Belischew.

Miscellaneous contributions, including a report of the Siberian Ornithological Society for 1928.

[1] Review contributed by T. S. Palmer.

CORRESPONDENCE.

Common Sense and Nomenclature.

In his recent 'Revision of the Wood-Warbler Genus *Basileuterus* and its Allies',[1] Mr. W. E. Clyde Todd shows that when, in 1848, Cabanis established the genus *Basileuterus* he used for his type the *Sylvia vermivora* of Vieillot. For the succeeding thirty-three years the name *Basileuterus vermivorus* was in good standing. Then it was shown by von Berlepsch that *Sylvia vermivora* Vieillot was in truth our Worm-eating Warbler, and *Basileuterus vermivorus* (Vieillot) became *Basileuterus auricapillus* (Swainson). But further application of the rules of nomenclature would synonymize *Basileuterus* with *Helmitheros*, the genus of the Worm-eating Warbler.

The substitution of *auricapillus* for *vermivorus* was made without question. It affects the names of only three birds. But the abandonment of the generic term *Basileuterus* would cause a change in the name of fifty-six birds. It has never been done and Mr. Todd frankly refuses to do it. He admits that by "a literal interpretation of the rules" *Basileuterus* should become a synonym of *Helmitheros;* but invoking "the rule of common sense" he claims that the circumstances that Cabanis inadvertently used for the type of his genus, a name "which had been originally applied to another and non-pertinent species, ought not to be allowed to overthrow his action, and upset such a peculiarly appropriate and long-established name for a large and important group."

With all of which I heartily agree. Possibly the rules governing *nomina conservanda* may permit an exhibition of "common sense." Meanwhile I for one propose to join Mr. Todd and continue to use *Basileuterus*. If his admirable example were followed more frequently that stability of names which the nomenclaturist has so long promised us would be more of a fact and less of a fallacy.

FRANK M. CHAPMAN.

American Museum of Natural History.
August 8, 1929.

[In spite of Dr. Chapman's plea, there will always be those who will hold the opposite view and we shall, therefore, have two names in use for the same thing. As we have a tribunal for passing on just such questions, why not submit them to the International Commission on Zoological Nomenclature and abide by its decision? The Commission seems to exercise "common sense," to some extent at least, as witness the preservation of the time-honored name GRUS!—ED.]

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[1] Proc. U. S. Nat. Mus., Vol. 74, pp. 1–95.

OBITUARIES.

THE American Ornithologists' Union and the American Museum have suffered irreparable loss by the death of Waldron De Witt Miller. On the morning of August 4th, after leaving Plainfield, N. J., on one of his frequent trips by motorcycle to the northern edge of the pine-barrens, he was approaching South River, N. J., when he collided with a motor-bus. His injuries were so grave that he expired on August 7th.

Of modest and even retiring nature, Miller was everywhere recognized as one of our foremost ornithologists. Born in 1879, he became an Associate of the Union in 1896, a member in 1906, and a Fellow in 1914. Since boyhood he had been an exceptionally keen outdoor student of birds. Growing up in Plainfield, he came to the notice of William Dutcher and thus of Dr. Chapman, who brought him to the American Museum of Natural History in 1903. His developing talents ensured promotion, until in 1918 he was made Associate Curator in Ornithology.

Miller's early papers in systematic ornithology were based on collections made by J. H. Batty in Mexico. His interests grew ever wider, and he undertook investigations of pterylography and skeletal features, including among his activities a study of the classification of Kingfishers. A trip to Nicaragua in 1917, accompanied by Ludlow Griscom, offered new opportunities for deepening his acquaintance with tropical birds, and his notebooks record the thoroughness with which he examined the specimens collected, before their preparation was completed.

His thirst for anatomical knowledge which could be utilized in classification was always increasing. Focussing his attention for several years on the Woodpeckers and their allies, he worked out the course of specialization in their development which has culminated in the Ivory-bill group. In recent years practically all the birds dying in the New York Zoological Park passed through his hands, providing rich material for his enthusiastic studies. His knowledge of pterylography, particularly of the wing, was unsurpassed. Special attention was also given to the digestive tract, carotid arteries, thigh and shoulder musculature, plantar tendons, and the many parts of the skeleton which offer evidences for the development of the major groups among living birds. He became deeply versed in the characters of Parrots and their allies. Birds of prey were cherished both alive and dead, and statistics as to their food was gathered on field-trips and in the laboratory.

During his 26 years of service to the American Museum, Miller continued his field-work assiduously. Scarcely a week-end or holiday passed without an excursion to some part of New Jersey, generally within 50 miles of his old home at Plainfield. A motorcycle was used to cover the territory which he surveyed so continuously and so fondly. To those who sometimes ac-

companied him on these trips he showed himself a true naturalist of devoted and unselfish character, astonishing in the wide field of his interest. He was thoroughly familiar with the flora, as with birds and mammals, and indefatigable in searching for snakes. These he would examine and measure before releasing them, hoping to find a few of them again on subsequent visits.

To his desk at the Museum, not only visiting ornithologists, but sportsmen, artists, game-wardens, teachers, and bird-lovers old and young, were attracted in numbers. Never did they leave without receiving whatever assistance he could give, and this was usually in abundance. In such ways, more than through writing, did Miller disseminate knowledge of birds. All who knew him testify to the unstinted aid and enlightenment they were given. To his colleagues at the Museum he was an unfailing fount of information and sound ornithological counsel. To this wide circle of admirers and warm personal friends his passing is a calamity.—J. P. CHAPIN.

HERBERT CHRISTOPHER ROBINSON, a Corresponding Fellow of the American Ornithologists' Union since 1918, died at Oxford, England, May 30, 1929, at the age of 54, after being in poor health for nearly a year. He was descended from a prominent Liverpool family, the son of John Park and Mary Morris Robinson, and was born at Liverpool, Nov. 4, 1874. His education was received at Marlborough College where he developed a taste for natural history and at the Royal School of Mines, but illness prevented completion of his course at the latter institution. In 1894 he went to Davos, Switzerland, and two years later had recovered sufficiently to undertake an expedition to Queensland. Here he collected birds in the vicinity of Cooktown but was compelled to return on account of illness. From 1897 to 1900 he became an assistant of Dr. H. O. Forbes in the Liverpool Museum and took part in the publication of a series of catalogues of the collections of birds in that institution, most of which had been presented by the 13th Earl of Derby.

In 1900 Robinson began twenty-five years of active field work in the tropics when he joined Dr. N. Annandale in an expedition to the Malay Peninsula and part of the results of this expedition appeared in the 'Fasciculi Maylayensis' from 1903 to 1907. He became Curator of the Selangor State Museum at Kuala Lumpur in 1903 and subsequently was made Director of the Federated Malay States Museums, a post which he held until 1926. In addition to the museum at Kuala Lumpur he was also in charge of the museum at Taiping in Perak. In 1908 he was joined by Cecil Boden Kloss with whom for nearly 20 years he carried on active zoological explorations in the Indo-Malay region, many of the results of which have appeared in the 'Journal of the Federated Malay States Museums.' He reorganized the Museum at Kuala Lumpur, and in passing it may be mentioned that its valuable collection of vertebrates has recently been transferred to the Raffles Museum at Singapore. In addition to this

work he found time to organize a Bureau of Fisheries, a Meteorological Service, and to investigate the possibility of founding hill stations in the Malay Peninsula. In 1924 and 1925 he was in England in charge of the Malayan Pavilion at the Wembley Exposition, and after his retirement made a final visit to Kuala Lumpur in 1927. He then returned to London to work on his project of the 'Birds of the Malay Peninsula,' in five volumes, of which two were published and a third half done when illness caused a suspension of the work.

Robinson was unmarried, was elected a Member of the British Ornithologists' Union in 1898, and at the time of his death was Joint Editor of 'The Ibis.' A more extended notice of his work from which the above facts have been obtained may be found in 'The Ibis' for July, 1929, pp. 523–526.—T. S. P.

Anthony Rudolph Kuser, an Associate of the American Ornithologists' Union since 1908 and a prominent patron of ornithology, died after a brief illness on Feb. 8, 1929, at his winter home at Palm Beach, Fla. He was born at Newark, N. J., May 12, 1862 and was one of six children of Rudolph and Rosalie Prieth Kuser.

In spite of many business interests chiefly power and electrical—he was a director in 54 corporations and had served on the State Tax Board, the Highway Commission and on the personal staff of three governors—Colonel Kuser found time to devote considerable attention to birds and conservation. He was also a member of several clubs including the Blooming Grove Park Club of Pike Co., Pa., and the Chelsea Plantation Club of South Carolina. At his home at Bernardsville, N. J., he maintained for several years an extensive collection of pheasants and his special interest in these birds developed into a project for a more comprehensive monograph on pheasants than any hitherto published and based on original information collected in the field. As a member of the Board of Managers and a Benefactor of the N. Y. Zoological Park he succeeded in carrying out this project through the Kuser Expedition, organized by the Zoological Society, under the personal direction of William Beebe who spent 17 months from Dec., 1909 to May, 1911 studying the birds in their native haunts in Ceylon, India, Burma, the Malay States, Java, Borneo, China and Japan.

The results of this expedition were published in Beebe's 'Monograph of The Pheasants,' a sumptuous illustrated work which appeared in 4 volumes in 1918–22, and in a smaller edition in 2 volumes in 1926 (see 'The Auk,' 1919, pp. 119–125 and 1927, p. 267).

Colonel Kuser was active in advancing the work of the New Jersey Audubon Society and served as its president for two years. His contributions to science and conservation took the form of providing means of carrying out through others projects which were carefully planned and well executed. In this respect his work was well worthy of emulation. A handsome species of Blood Pheasant (*Ithaginis kuseri*) from Yunnan now bears his name but for the general public the Kuser Expedition, the

pheasant monograph, and the gift to the State by Colonel and Mrs. Kuser of their beautiful estate at High Point, Sussex Co., N. J., are the enduring monuments by which this modest but far-sighted patron of science will long be remembered.—T. S. P.

Howard George Lacey, an Associate of the American Ornithologists' Union, elected in 1899, died at Bournemouth, England, March 5, 1929, in the 73rd year of his age. He was born at Wareham, Dorset, England, April 15, 1856 and was educated during his early years at Charterhouse in Hampshire, but later he studied at Frankfort, Germany and received the degree of B.A. from Cains College, Cambridge, England. At the age of 26 he came to America and located in south central Texas, on a ranch on Turtle Creek, about 10 miles from Kerrville. Here he made his home for 40 years and devoted his attention to raising horses, cattle and Angora goats.

Howard Lacey was much interested in natural history and soon became an authority on the fauna and flora of this part of Texas. He maintained a wide correspondence with naturalists in various parts of the country and those who visited the State received a cordial welcome at the Lacey Ranch. He collected many natural history specimens but published comparatively little. His chief ornithological publications were two papers on 'The Birds of Kerrville, Texas, and Vicinity,' in 'The Auk' for 1911 and 1912, which contained notes on the local occurrence of 208 species. In recognition of his activity in zoological work his name has been bestowed on three forms of small mammals: *Peromyscus pectoralis laceianus*, a white-footed mouse from Kerrville, *P. boylei laceyi* and *Reithrodontomys laceyi*. The last two names, however, are now usually placed in synonymy.

In 1919 Lacey disposed of his ranch at Kerrville and returning to England settled near Bournemouth. Since then he has revisited Texas only once, during a brief trip in 1925. He is survived by a sister, Miss Beatrice Lacey of Bournemouth, and three brothers, Ben, Charles, and Sir F. E. Lacey of London.—T. S. P.

William Florian Roberts, an Associate of the Union from 1888 to 1899 and since 1924, died in Washington, D. C., Feb. 18, 1929. Last November he suffered from double pneumonia and complications following that attack resulted in his death. He was born in Washington, July 14, 1855, received his education in the local public schools and began work as a messenger boy for the Western Union Telegraph Co. Later he learned the printer's trade and organized the Law Reporter Printing Co., then the Gedney and Roberts Co., and in 1891 the W. F. Roberts Co., of which he was president at the time of his death.

Roberts was always actively interested in outdoor sports and was a member of several local organizations including the Potomac Boat Club, the old Capital Bicycle Club and the Columbia Country Club. For some years he was a member of the Glebe Club, a shooting club on the Patuxent River, and later of the Belmont Bay Club on the Potomac, and always

maintained a keen interest in rail and duck shooting. He was well acquainted with the common local birds, especially the game birds, and years ago began to make a collection of skins. His early field work was done in association with Ridgway, Henshaw, Fisher, William Palmer and others. Two of the species on the local list of birds of the District of Columbia were originally added on the basis of specimens which he collected,—the Lark Sparrow, taken Aug. 25, 1877, and the Dowitcher, Sept. 2, 1878, the former recorded by Ridgway and the latter by himself. He also contributed several important records of game birds secured in the course of his long experience as a sportsman. One of his activities in connection with the Union was in handling the programs for several of the early Washington meetings and the personal attention which he gave the work always insured accuracy and prompt delivery. Roberts excelled in whatever he undertook and through his cheerful and cordial manner gained a host of friends and was widely known in business and athletic circles of the Capital.—T. S. P.

George Rivers White, the oldest Canadian Associate of the Union, died near Ottawa, Ontario, Nov. 27, 1927 at the age of 71. Death came suddenly and peacefully as he was admiring the setting sun while on a Sunday afternoon walk. He was born at Quebec, Oct. 3, 1856, and at the early age of 15 entered the service of the Post Office Department where he remained for half a century until he retired in 1921. During this time he became an authority on postal matters and fully conversant with the various details of the service.

White began collecting in the days when Passenger Pigeons were still found about Ottawa and his collection contained several specimens of these interesting birds which he himself obtained. Members who attended the Ottawa meeting of the A. O. U. in 1926 and had the pleasure of examining the White collection will recall the neatness and compactness of its arrangement. It was one of the best local collections in Canada and included a number of specimens which constituted important records for the Ottawa region. Unfortunately White published comparatively little, chiefly records and lists of the birds of Ottawa. He was one of the founders of the Ottawa Field Naturalists' Club and was a member of its Council at the time of his death. He joined the American Ornithologists' Union in 1903 and for 24 years continued as an Associate. For 45 years he contributed notes on bird migration to the Biological Survey. He now rests in Beechwood Cemetery in a part of the forest where he made many of his bird records. A portrait and a more extended account of his activities, from which the above facts were obtained, may be found in the 'Canadian Field Naturalist' for May, 1929, pp. 13–14.—T. S. P.

Robert Deshan Camp, an Associate of the American Ornithologists' Union since 1926, died at Brownsville, Texas, August 6, 1929, after an illness of seven months during which he lost his eyesight. He was the son of Alfred E. and Adeline J. Camp and was born at Meriden, Conn., March

6, 1867. His education was received at a boy's school and in the local high school, supplemented in later life by constant reading. For some time he was connected with a novelty manufacturing company in Chicago and for 20 years was engaged in general engineering business.

Camp took up his residence in the Rio Grande Valley in 1908, living first at Lyford but later made his home at Brownsville. Here he developed his interest in natural history until he became known as one of the most active local collectors and one of the best authorities on the fauna of the Lower Rio Grande region. For several years he was connected with the Game, Fish & Oyster Commission of Texas and for nine years—since April 16, 1920—he served as a U. S. Deputy Game Warden. He was deeply interested in conservation of wild life, took an active interest in protective legislation, and largely through his efforts the bird reservation in southern Texas for the Reddish Egret and other Herons was established by the State in 1921 and leased to the National Association of Audubon Societies.

Camp was buried in Buena Vista Cemetery at Brownsville, and in accordance with his desire that the natural history specimens which he brought together should remain in the Valley, the collection has been offered to the City of Brownsville. He is survived by two sisters, Mrs. John J. Young, of Glen Ellyn, Ill., and Mrs. May R. Kavanaugh, of Chula Vista, Calif., and by a daughter, Mrs. Catheryn Shimmens, of Fresno, Calif.—T. S. P.

John Warren Achorn, elected as an Associate of the American Ornithologists' Union in 1921, died on August 5, 1926. He is best known to ornithologists through having sponsored for many years the study of birds in the sandhill region of North Carolina near Pine Bluff, where he made his winter home. Here he was active in encouraging observation of bird life, both among the young people native to the region, and among the older ones who, like the birds, made the sandhills their winter rendezvous. The Sandhills Bird Study Club, which he served as president, was the result of his devotion to this work.

It was his ambition to issue a list of the winter birds of this section, and this project, interrupted by his death, has since been consummated by the publication of a memorial volume, well illustrated in color, made possible by the efforts of a few of his devoted friends. Several chapters of this are from his own pen, and reflect his love for the region and its life.[1]

Dr. Achorn was born at Newcastle, Maine, on Jan. 30, 1857. He was educated at Bowdoin College and the Maine Medical School, and practiced in Boston for about twenty years. That he was a life-long lover of nature is evidenced by the titles of several of his publications—Nature's help to Health, Nature's help to Happiness, and Religion and Medicine.

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[1]A Guide to the Winter Birds of the North Carolina Sandhills, by M. P. Skinner, Albany, New York, 1928. (See The Auk, Apr. 1929, p. 254.)

He called himself a "woodser," which was his original way of expressing the fact, evident to anyone who had enjoyed the privilege of walking with him in the open, that he loved the outdoors in all its wholesome aspects.

In 1907 he married Harriet Priscilla Sawyer who became his constant companion in his peregrinations, and who, while he was studying the birds, was an equally enthusiastic student of the wild flowers.

The love of humanity was strong in Dr. Achorn's make-up. This was shown in his choice of a profession, and later in his efforts to assist his fellows in the appreciation of Nature. Many of his friends will long remember his Christmas or New Year greetings, which for many years took the form of short printed essays, generally inspired by some outdoor experience, and featuring, mayhap, the homely native philosophy of some friend or chance acquaintance, Anglo-Saxon or African. These, and an occasional letter, always reflecting his strong and wholesome personality, will be treasured by those whose fortune it was to know him.—EDWARD A. PREBLE.

JEWELL D. SORNBORGER, elected an Associate of the American Ornithologists' Union in 1888, and Member in 1901, but retired in 1908, died in Rowley, Massachusetts, on Feb. 24, 1929. He was born on Nov. 27, 1869. Always a keen student of ornithology, botany and other branches of natural history, he made three visits to Labrador in the pursuit of these studies in the nineties, and, in 1897, visited Funk Island off Newfoundland. Here he collected a large number of the bones of the Great Auk, from which he mounted several perfect skeletons, which are now preserved in the Museum of Comparative Zoology at Cambridge and in some other museums.

In 1896 he suffered his first attack of a disease of the heart and arteries, and from then on, he was increasingly subject to these attacks, which invalided him for long periods and finally resulted in his death. About 1901 he moved to Ipswich, and about a year later to the neighboring town of Rowley, where he lived the rest of his life. A careful and accurate observer and of a quiet and retiring disposition, he was an interesting talker on his chosen subjects, in which he kept up his interest to the last. In his long illnesses he was patient and uncomplaining. He leaves a widow and three daughters.—C. W. TOWNSEND.

NOTES AND NEWS.

WITH the increasing number of bird students who desire to submit some of their more important observations to the ornithological journals for publication, there is naturally a number who are not familiar with the universally accepted rules governing such publication. When a writer submits a paper or note to a journal for publication it is understood that he has not submitted it to any other journal and will not do so unless it is rejected by the first recipient.

With the present high cost of publication it is out of the question to go to the expense of publishing matter that has been or will be published elsewhere. We have received a number of items some of which have been printed only to find them appearing also in the next number of some other journal. While the editors do their best to prevent this, some duplications slip through and use up resources that could be devoted to the publication of other original matter.

We trust that our contributors will bear this in mind and aid us in making our funds go as far as possible.

DR. ALEXANDER WETMORE, President of the A. O. U. has appointed as a committee to consider the award of the Brewster Memorial Medal, which is to be made at the meeting of the Union in October, Charles W. Richmond, James H. Fleming and James L. Peters.

MR. GEORGE M. SUTTON left in July for Southampton Island for a year's stay, to be devoted to the study of bird life in this far north region. He will be glad to hear from his friends during the winter, especially about Christmas time and greetings may be sent through radio station KDKA Pittsburgh, which will be broadcasting to him every two weeks.

SERIES OF 'THE AUK.'—The 'Bulletin of the Nuttall Ornithological Club,' in 8 volumes, and 'The Auk' in 46, with the general Indexes form a total of 57 volumes which naturally fall into 5 series marked by the Indexes. These series are as follows: I, Volumes 1–8 of the 'Bulletin,' 1876–1883; II, Volumes 1–17 of 'The Auk', 1884–1900, with the general Index for both I and II; III, Volumes 18–27, 1901–1910, with the ten year Index; IV, Volumes 28–37, 1911–1920 with the second ten year Index; and V, Volumes 38–46, 1921–1929.

As complete sets are now difficult to obtain, members are sometimes discouraged in attempting to secure missing volumes. Those who now have incomplete 'runs' will do well to look over their back volumes and, while back volumes are still obtainable, secure the numbers with the corresponding Index necessary to complete any series now incomplete. They will then have one or more units each complete in itself which possibly can be built up later into a set.—T. S. P.

COMPLETE SETS OF 'THE AUK'.—A complete set of 'The Auk' now includes 46 volumes and the three general Indexes for 1876–1900, 1901–1910

and 1911–1920. Ten years have elapsed since the first survey of complete sets was made (see 'The Auk,' Oct. 1919, p. 634; Apr. 1920, pp. 348–352), and the total then showed approximately 150 sets of which about 60 were in public libraries. In 'The Auk' for Jan. 1924, pp. 207–212 a revised list appeared with a total of 203 sets of which 87 were in public libraries or museums. The list has now been corrected and as here given increases the total to 232 of which 109 are in public institutions. More than 80 per cent of these sets are bound and over 100 contain the complete series of eight volumes of the 'Bulletin of the Nuttall Ornithological Club.'

The following list is arranged geographically, as before, with sets in public libraries mentioned first, followed by those in private hands. An asterisk (*) indicates that one or two volumes are incomplete or missing. In addition to the sets enumerated are several others which belonged to members who have died recently including those of J. H. Clark, H. K. Coale, J. S. Dexter, Jonathan Dwight, L. A. Fuertes, Mrs. M. W. Levey, Harry Merrill and Robert Ridgway, each of which was supposed to be complete at the time of the owner's death.

The Secretary will appreciate any corrections which will render the list more accurate and he will take pleasure in advising members who may be interested in obtaining back numbers or Indexes to complete their sets.

ALABAMA

Dept. Archives & History, Montgomery

ARIZONA

University of Arizona, Tucson

CALIFORNIA—27

California Academy of Sciences, San Francisco
Calif. Institute of Technology, Pasadena (2) (D. R. Dickey sets)
Leland Stanford Jr. University, Palo Alto
Museum of History, Science and Art, Los Angeles
*Santa Barbara Mus. Nat. Hist.
Scripps Institution, La Jolla
University of California, Berkeley
Bishop, Dr. L. B., Pasadena
Chambers, W. Lee, Eagle Rock, Los Angeles
Ellis, Ralph, Berkeley (Witmer Stone extra set)
*Emerson, W. O., Haywards
Evermann, Dr. B. W., San Francisco
Fisher, Prof. W. K., Pacific Grove (C. E. Bendire set)
Fowler, F. H., Palo Alto
Grinnell, Dr. Joseph, Berkeley
Harris, Harry, Eagle Rock
Hoffmann, Ralph, Santa Barbara
*Huey, L. M., San Diego
Ingersoll, A. M., San Diego
Law, J. E., Altadena
Mailliard, Joseph, San Francisco
*Mitchell, Dr. W. I., Berkeley
Morcom, G. Frean, Los Angeles
*Sampson, W. B., Stockton
Storer, T. I., Davis
Swarth, H. S., Berkeley (F. Stephens set)

COLORADO—3

Coburn Library, Colorado College, Colorado Springs
University of Colorado, Boulder
Bergtold, Dr. W. H., Denver

CONNECTICUT—4

Peabody Museum, Yale University, New Haven
Pequot Library, Southport
Watkinson Library, Hartford
Seton, Ernest T., Greenwich

DISTRICT OF COLUMBIA—18

Library of Congress, Washington
U. S. Dept. Agriculture, Wash.
U. S. National Museum, Wash.
Bailey, Mrs. Vernon, Washington
Bartsch, Dr. Paul, Washington
Bond, Frank, Washington
Cooke, Miss M. T., Washington
Fisher, Dr. A. K., Washington
Howell, A. H., Washington
Nelson, Dr. E. W., Washington
Oberholser, Dr. H. C., Washington (W. Faxon set)
Palmer, Dr. T. S., Washington
*Preble, E. A., Washington
Richmond, Dr. Chas. W., Wash.
Riley, Joseph H., Washington
Smith, Dr. H. M., Washington
*Stejneger, Dr. Leonhard, Wash.
Wetmore, Dr. Alexander, Wash. (E. A. Mearns set)

FLORIDA—4

Bailey, H. H., Miami
*Byrd, Dr. Hiram, Tampa
Nehrling, H., Naples
Williams, R. W., Tallahassee (McIlwraith set)

ILLINOIS—11

Field Museum, Chicago
Illinois State Laboratory of Natural History, Urbana
John Crerar Library, Chicago
University of Chicago, Chicago
Barnes, R. Magoon, Lacon
Conover, H. B., Chicago (W. H. Osgood set)
Deane, Ruthven, Chicago
Gault, B. T., Glen Ellyn
*Gregory, S. S. Jr., Winnetka
Knickerbocker, C. K., Chicago (H. C. Oberholser set)
Thordarson, C. H., Chicago

INDIANA—5

Indiana State Library, Indianapolis
Indiana University Library, Bloomington
Bretsch, Clarence, Gary (E. P. Bicknell set)
Butler, Amos W., Indianapolis
*Welling, Yens N., Anderson

IOWA—3

Iowa State College, Ames
University of Iowa, Iowa City
Stephens, Prof. T. C., Sioux City

KANSAS

State Library, Topeka
Bunker, C. D., Lawrence

MAINE—4

Bowdoin College, Brunswick (F. H. Knowlton set)
Public Library, Portland (N. C. Brown set)
Johnson, H. H., Pittsfield
Norton, Arthur H., Portland

MARYLAND

Enoch Pratt Free Library, Baltimore
Kirkwood, Frank C., Monkton

MASSACHUSETTS—29

Boston Public Library
Boston Society of Natural History
Fall River Public Library (Owen Durfee set)
Harvard College, Cambridge
Mass. Agricultural College, Amherst
Mass. Audubon Society, Boston (H. A. Purdie set)
Mass. Board of Agriculture Boston (Wm. Dutcher set)
Mass. State Library Boston
Mt. Holyoke College, South Hadley
Museum Comparative Zoology, Cambridge
New Bedford Public Library
Springfield Library Association (Harold Herrick set)
*Taunton Public Library
Thayer Museum, Lancaster
Bagg, A. C., Holyoke
Batchelder, Charles F., Cambridge
Bent, A. C., Taunton
Bigelow, H. L., Chestnut Hill
Chamberlain, Chauncy W., Boston
Farley, John A., Watertown
Fletcher, L. B., Brookline (Merriam set)
Jeffries, William A., Boston
Kennard, F. H., Newton Centre
Kidder, N. T., Milton
Lawson, Ralph, Salem (W. H. Fox set)
Osborne, A. A., Peabody (C. F. Jenne set)
Phillips, Dr. John C., Wenham
Townsend, Dr. Charles W., Ipswich
Tyler, Dr. Winsor M., Boston

MICHIGAN—7

Detroit Public Library
Grand Rapids Public Library
Kent Sci. Mus., Grand Rapids
Mich. State College, East Lansing
Museum of Zoology, University of Michigan, Ann Arbor (B. H. Swales set)
*Moore, Mrs. Nettie L., Plymouth (J. B. Purdy set)
Wood, Norman A., Ann Arbor

MINNESOTA

Minneapolis Athenaeum and Public Library
Roberts, Dr. Thomas S., Minneapolis

MISSISSIPPI

Agricultural College, College

MISSOURI
Bolt, Benjamin F., Kansas City
Widmann, Otto, St. Louis

MONTANA
*University of Montana, Missoula

NEBRASKA
University of Nebraska, Lincoln
Dille, Frederick M., Valentine

NEW HAMPSHIRE—4
Dartmouth College, Hanover
Haile, H. P., Hanover (R. O. Morris Set)
White, Francis Beach, Concord
Whittle, Mr. and Mrs. C. L., Peterboro

NEW JERSEY—3
Princeton University, Princeton
Bowdish, B. S., Demarest
Havemeyer, H. O., Mahwah

NEW MEXICO
Langstroth, J. H., Silver City

NEW YORK—25
American Museum Natural History, New York
Brooklyn Museum
Brooklyn Public Library
Buffalo Public Library
*Colgate University, Hamilton
Columbia University, New York
Cornell University, Ithaca
Nat. Association Audubon Societies, New York
New York Public Library
N. Y. State College of Forestry, Syracuse
New York State Library, Albany
New York Zoological Society
University of Rochester, Rochester
Vassar College, Poughkeepsie
Braislin, Dr. Wm. C., Brooklyn
Chapman, Dr. Frank M., New York
Crosby, M. S., Rhinebeck
Ferguson, H. L., New York (J. A. Allen set)
Grinnell, Dr. Geo. Bird, New York
*Helme, A. H., Miller Place
King, Le Roy, New York
Pangburn, C. H., Chappaqua (W. C. Metcalfe set)
Philipp, P. B., New York
Williams, R. S., New York
Wright, F. S., Auburn

OHIO—10
Cincinnati Public Library
Cincinnati Society Natural History
Cleveland Museum, Cleveland (J. L. Childs set)
Oberlin College, Oberlin
Ohio State University, Columbus
Western Reserve University (Adelbert College), Cleveland
Baldwin, S. P., Cleveland (Paul Leverkuhn set)
Brandt, H. W., Cleveland (R. W. Jackson set)
*Broomhall, W. H., Stockport
Jones, Lynds, Oberlin
Nice, Mrs. M. M., Columbus (H. W. Henshaw set)

OKLAHOMA
*Hallinen, J. E., Cooperton

OREGON—3
University of Oregon, Eugene
State Agric. College, Corvallis (A. B. Howell set)
*Jewett, S. G., Portland

PENNSYLVANIA—9
Academy Natural Sciences, Philadelphia
Carnegie Library, Pittsburgh
Carnegie Museum, Pittsburgh (W. E. C. Todd set)
Boulton, W. R., Pittsburgh (L. B. Woodruff set)
Burns, Frank L., Berwyn
Christy, B. H., Sewickley (T. G. Pearson set)
Fisher, Miss Elizabeth W., Ambler
Norris, J. Parker, Jr., Philadelphia
Stone, Dr. Witmer, Philadelphia

RHODE ISLAND
Hathaway, Harry S., South Auburn

SOUTH CAROLINA
Charleston Museum, Charleston (Wm. Brewster set)
Wayne, Arthur T., Mt. Pleasant

TEXAS
University of Texas, Austin
*J. J. Carroll, Houston

WASHINGTON—3
Public Library, Seattle
University of Washington, Seattle
Rathbun, Samuel F., Seattle

WISCONSIN—5
Milwaukee Public Museum
University of Wisconsin, Madison
Hollister, W. D. Delavan (Ned Hollister set)
*Schorger, A. W., Madison
Taylor, Warner, Madison (special J. A. Allen set)

PHILIPPINE ISLANDS
Bureau of Science, Manila

ARGENTINA
Museo Nacional, Buenos Aires

AUSTRIA
Naturhistorisches Museum, Vienna

CANADA—14
- Geological Survey, Ottawa
- Laval University, Quebec
- McGill University, Montreal
- Public Library, London (W. E. Saunders set)
- Public Library, Toronto
- University of Manitoba, Winnipeg
- Arnold, Edward, Montreal
- *DeLury, R. E., Ottawa
- Fleming, James H., Toronto
- Keays, J. L., London
- Lloyd, Hoyes, Ottawa
- Rowan, Wm., Edmonton
- *Taverner, Percy A., Ottawa
- White, E. F. G., Ottawa (G. R. White set)

DENMARK
- Royal Library, Copenhagen

ENGLAND—6
- British Museum Natural History, London
- Newton Library, Zool. Dept. Kings College, Cambridge (Alfred Newton set)
- Zoological Society of London
- Zoological Museum, Tring
- Jourdain, F. C. R., Bournemouth
- Mathews, Gregory M., Meadway, Winchester

FRANCE
- Museum Histoire Naturelle, Paris
- Delacour, Jean, Paris

GERMANY—3
- K. Zoologisches Museum, Berlin
- Museum Zool. Stats-Sammlung, Munich (Blasius set)
- University of Göttingen, Göttingen

HOLLAND
- Royal Museum Natural History, Leiden

RUSSIA
- Zool. Museum Acad. of Sciences, Leningrad

SCOTLAND
- Royal Scottish Museum, Edinburgh

SWEDEN
- Royal Swedish Academy Sciences, Stockholm

TRANSVAAL
- Transvaal Museum, Pretoria, S.A

T. S. PALMER,
Washington, D. C.

DR. HERBERT FRIEDMANN, formerly of Amherst College, and well known for his work on parasitism in birds and on African birds, has been appointed Curator of Birds in the U. S. National Museum, the post so long held by the late Robert Ridgway.

AGAIN we urge all members of the Union to make arrangements to attend the A. O. U. meeting in Philadelphia, October 21–25. Headquarters will be at the Benjamin Franklin Hotel, Ninth and Chestnut Sts., and the scientific sessions will be held at the Academy of Natural Sciences. Besides the usual interesting program of ornithological papers there will be a luncheon tendered by the Zoological Society, at the Zoo, on Tuesday, after which the wonderful collection of living birds and mammals and reptiles will be inspected and on Friday the local committee has chartered a special train for a day's trip to Cape May at the southern extremity of New Jersey where Delaware Bay joins the Ocean, and where a number of birds may be seen.

The local committee would appreciate it if all those who plan to attend would notify Dr. Stone, Chairman, at the Academy of Natural Sciences, as soon as possible, as this will greatly facilitate the arrangements.

INDEX TO VOLUME XLVI

[New generic, specific and subspecific name are printed in heavy face type.]

DATES OF ISSUE.

Vol. XLV, No. 4—October 10, 1928.
Vol. XLVI, No. 1—January 17, 1929.
Vol. XLVI, No. 2—April 11, 1929.
Vol. XLVI, No. 3—July 11, 1929.

THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Edited by Dr. Witmer Stone

ACADEMY OF NATURAL SCIENCES, LOGAN SQUARE

PHILADELPHIA, PA.

To whom all articles and communications intended for publication and all books and publications for review should be sent.

Manuscripts for leading articles must await their turn for publication if others are already on file, but they must be in the editor's hands at least six weeks before the date of issue of the number for which they are intended, and manuscripts for 'General Notes,' 'Recent Literature,' etc., not later than the first of the month preceding the date of issue of the number in which it is desired they shall appear.

Twenty-five copies of leading articles are furnished to authors free of charge. Additional copies or reprints from 'General Notes,' 'Correspondence,' etc., must be ordered from the editor.

THE OFFICE OF PUBLICATION

8 WEST KING STREET, LANCASTER, PA.

Subscriptions may also be sent to W. L. McAtee, Business Manager, 200 Cedar St., Cherrydale, Va. Foreign Subscribers may secure 'The Auk' through H. F. and G. Witherby, 326 High Holborn, London, W. C.

Subscription, $4.00 a year. Single numbers, one dollar.

Free to Honorary Fellows, and to Fellows, Members, and Associates of the A. O. U., not in arrears for dues.

. . . NOTICE . . .

The plan of offering for sale separates of the leading articles in 'The Auk' has been discontinued as there was not sufficient demand to make it worth while. We have on hand from 25 to 50 copies of most of the articles from April 1920 to October 1928. Anyone desiring to obtain such lots of his own or other papers at a nominal price should apply at once to the Editor as after a short time the pamphlets will be disposed of.

MEETINGS OF THE A. O. U.

Meeting	Date	Place	Fellows Present	Total Membership
1	1883, Sept. 26–28	1st New York	21	23
2	1884, Sept. 30–Oct. 2	2d New York	16	143
3	1885, Nov. 17–18	3d New York	16	201
4	1886, Nov. 16–18	1st Washington	20	251
5	1887, Oct. 11–13	1st Boston	17	284
6	1888, Nov. 13–15	2d Washington	20	298
7	1889, Nov. 12–15	4th New York	20	400
8	1890, Nov. 18–20	3d Washington	20	465
9	1891, Nov. 17–19	5th New York	14	493
10	1892, Nov. 15–17	4th Washington	20	557
11	1893, Nov. 20–23	2d Cambridge	17	582
12	1894, Nov. 12–15	6th New York	15	616
13	1895, Nov. 11–14	5th Washington	19	667
14	1896, Nov. 9–12	3d Cambridge	14	673
15	1897, Nov. 8–11	7th New York	18	679
16	1898, Nov. 14–17	6th Washington	21	695
17	1899, Nov. 13–16	1st Philadelphia	16	744
18	1900, Nov. 12–15	4th Cambridge	19	748
19	1901, Nov. 11–14	8th New York	18	738
20	1902, Nov. 17–20	7th Washington	25	753
20a	1903, May 15–16	1st San Francisco	7	—
21	1903, Nov. 16–19	2d Philadelphia	19	775
22	1904, Nov. 28–Dec. 1	5th Cambridge	17	808
23	1905, Nov. 13–16	9th New York	17	860
24	1906, Nov. 12–15	8th Washington	24	750
25	1907, Dec. 9–12	3d Philadelphia	20	850
26	1908, Nov. 16–19	6th Cambridge	17	888
27	1909, Dec. 6–9	10th New York	19	866
28	1910, Nov. 14–17	9th Washington	23	897
29	1911, Nov. 13–16	4th Philadelphia	18	887
30	1912, Nov. 11–14	7th Cambridge	18	929
31	1913, Nov. 10–13	11th New York	28	992
32	1914, Apr. 6–9	10th Washington	27	1101
33	1915, May 17–20	2d San Francisco	11	1156
34	1916, Nov. 13–16	5th Philadelphia	26	830
35	1917, Nov. 12–15	8th Cambridge	21	891
36	1918, Nov. 11	12th New York	14	953
37	1919, Nov. 10–13	13th New York	28	1024
38	1920, Nov. 8–11	11th Washington	25	1142
39	1921, Nov. 7–10	6th Philadelphia	25	1351
40	1922, Oct. 23–26	1st Chicago	24	1457
41	1923, Oct. 8–11	9th Cambridge	25	1652
42	1924, Nov. 10–13	1st Pittsburgh	26	1637
43	1925, Nov. 9–12	14th New York	30	1705
44	1926, Oct. 11–14	1st Ottawa	22	1815
45	1927, Nov. 14–17	12th Washington	30	1772
46	1928, Nov. 19–22	1st Charleston	27	1741

The next Stated Meeting will be held at Philadelphia, October 21–24, 1929.